Feb 23076

Augusta
GEORGIA

CONSULTANT SERVICES AGREEMENT

PROFESSIONAL SERVICES

TO ASSESS & ANALYZE WATERSHEDS,

INVENTORY STORMWATER FACILITIES

& STORM CONVEYANCE

PROJECT #: 328-041110-211828002

Augusta, GA Engineering Department
Engineering Division
POC: Hameed Malik, Ph.D., PE, Assistant Director
~WK Dickson~

Augusta
GEORGIA

CONSULTANT SERVICES AGREEMENT
PROFESSIONAL SERVICES TO ASSESS & ANALYZE WATERSHEDS, INVENTORY STORMWATER FACILITIES & STORM CONVEYANCE
PROJECT NUMBER: 328-041110-211828002

TABLE OF CONTENTS:

Augusta, GA Engineering Department

REQUEST FOR QUALIFICATIONS

CONSULTANT SERVICES AGREEMENT
PROFESSIONAL SERVICES TO ASSESS & ANALYZE WATERSHEDS, INVENTORY STORMWATER FACILITIES & STORM CONVEYANCE
PROJECT NUMBER: 328-041110-211828002

Request for Qualifications

Request for Qualifications will be received at this office until Friday, June 21, 2013 @ 11:00 a.m. for furnishing:

RFQ Item #13-149 **Professional Services to Assess & Analyze Watersheds, Inventory Stormwater Facilities & Storm Conveyance for Engineering Department**

RFQs will be received by: The Augusta Commission hereinafter referred to as the OWNER at the offices of:

Geri A. Sams, Director
Augusta Procurement Department
530 Greene Street - Room 605
Augusta, Georgia 30901

RFQ documents may be viewed on the Augusta Georgia web site under the Procurement Department **ARCbid.** RFQ documents may be obtained at the office of the Augusta, GA Procurement Department, 530 Greene Street – Room 605, Augusta, GA 30901.

All questions must be submitted in writing by fax to 706 821-2811 or by email to procbidandcontract@augustaga.gov to the office of the Procurement Department by Friday, June 7, 2013 @ 5:00 P.M. No RFQ will be accepted by fax, all must be received by mail or hand delivered.

No RFQ may be withdrawn for a period of **90** days after time has been called on the date of opening.

Invitation for bids and specifications. An invitation for bids shall be issued by the Procurement Office and shall include specifications prepared in accordance with Article 4 (Product Specifications), and all contractual terms and conditions, applicable to the procurement. **All specific requirements contained in the invitation to bid including, but not limited to, the number of copies needed, the timing of the submission, the required financial data, and any other requirements designated by the Procurement Department are considered material conditions of the bid which are not waiveable or modifiable by the Procurement Director.** All requests to waive or modify any such material condition shall be submitted through the Procurement Director to the appropriate committee of the Augusta, Georgia Commission for approval by the Augusta, Georgia Commission. Please mark RFQ number on the outside of the envelope.

Bidders are cautioned that acquisition of RFQ documents through any source other than the office of the Procurement Department is not advisable. Acquisition of RFQ documents from unauthorized sources places the bidder at the risk of receiving incomplete or inaccurate information upon which to base his qualifications.

GERI A. SAMS, Procurement Director

Publish:
Augusta Chronicle May 16, 23, 30, June 6, 2013
Metro Courier May 22, 2013

cc: Tameka Allen Deputy Administrator
Abie Ladson Engineering Department
Hameed Malik Engineering Department

Revised: 8/15/2011

Augusta, GA Engineering Department

SCOPE OF SERVICES

CONSULTANT SERVICES AGREEMENT
PROFESSIONAL SERVICES TO ASSESS & ANALYZE WATERSHEDS, INVENTORY STORMWATER FACILITIES & STORM CONVEYANCE
PROJECT NUMBER: 328-041110-211828002

PROFESSIONAL SERVICES TO ASSESS & ANALYZE WATERSHEDS, INVENTORY STORMWATER FACILITIES & STORM CONVEYANCE
PROJECT NUMBER: 328-041110-211828002

SCOPE OF SERVICES

Objective: The objective of the project to characterize the **CITY's** watersheds sufficiently to develop specific management recommendations for the watersheds through a multi-phase effort. Management recommendations may include BMPs, bank stabilization projects, asset replacement, and water quality and / or quantity monitoring. Concepts for walking trails may also be analyzed for compatibility in meeting watershed management needs.

SCOPE OF WORK:

Phase 1: System Inventory: Closed Pipe and Upland Ditches

Overview : The objective of Phase 1 will be to inventory and characterize the stormwater conveyance system.

Task A: Digitize Existing Scanned Images

1. The **CONSULTANT** will utilize scanned images of the **CITY's** conveyance system as provided by the **CITY** to digitize existing storm drainage assets. The subject hydrologic basin(s) contain 1,500 scanned images that have been georeferenced, rectified, and filed as part of the AED basedata geodatabase provided by the **CITY**. Not all of these sheets contain storm drainage assets and as such, an initial review of all 1,500 sheets will be completed and the sheets will be sorted based on whether storm data can be digitized from the scanned image.

2. Additionally, the **CITY** will provide the **CONSULTANT** with scanned images that have not been georeferenced, rectified and incorporated into the AED basedata geodatabase. These images are anticipated to be provided in groups of 50 sheets per delivery; however the total number of scanned images is not known. The **CONSULTANT** will georeferenced and rectify the images using available GIS data provided by the **CITY** utilizing rubbersheeting practices. The **CONSULTANT** will not utilize spatial filtering techniques such as kriging or warping to provide precise image alignment, rather a "best fit" using available background data will be performed. Once the scanned images are georeferenced and rectified, they will be included in the AED basedata geodatabase.

3. Scanned images containing storm drainage data will be digitized using on-screen digitization techniques. Available attribute information will be populated per the AED stormwater geodatabase schema as it is available on the source documents.

Attributes identified in the AED stormwater geodatabase schema that are not available on the source documents will be populated during the field inventory tasks.

The **CONSULTANT** will track the receipt and work progress for each scanned image in a database format capable of being shared with the **CITY**. Updates on the status of scanned images will be made available to the **CITY** on a weekly basis.

The **CONSULTANT** will invoice the **CITY** based on per unit pricing for scanned images as provided in the Agreement.

Task B: Inventory of Closed Pipe and Open Conveyance Systems

1. As the **CONSULTANT** completes the work tasks identified in Task A for portions of the storm drainage system, inventory crews will begin an in-the field review of digitized assets and collection of additional storm drainage data not available on source documents.

   The **CONSULTANT** will review digitized portions of their assigned hydrologic basin(s) with the **CITY** prior to the commencement of field inventory efforts. Portions of the system to be field inventoried will be roughly comprised of complete drainage sub-systems including collection and conveyance structures upstream of the point at which stormwater discharges into a receiving stream.

   During this review, the **CITY** will update the **CONSULTANT** on any issues impacting the ability of field crews to process through the inventory area. This may include but is not limited to easement access, construction activities, traffic coordination or public notification. The **CITY** and the **CONSULTANT** will also review questionable areas of the system in an effort to provide field crews with advance intelligence on how to complete the field inventory effort.

   Once deployed, field crews will verify storm drainage structure locations and attribute data as digitized from source documents. Structures found in the field that did not appear on source documents will be recorded using a GPS or digitized locations. The **CONSULTANT** will populate attribute data per the AED stormwater geodatabase schema. Similarly, attribute data missing from source documents or inconsistent with field observations will be entered into the geodatabase. The intent of the field inventory process will be to verify or edit the geodatabase to reflect conditions as identified in the field.

   Field crews will also provide a cursory assessment of the condition of the structure. Structures will be classified as Good, Fair or Poor based on observation from the surface. Field crews will not enter any structure for the purpose of obtaining attributes or condition assessment information.

A minimum of two (2) photographs of each structure will be collected and linked to the asset in the GIS. Photographs are to include one photograph showing the structure and surrounding area and a second photograph is to show the interior of the structure. The **CONSULTANT** will not remove grates or structure tops to collect attributes or photographs other than on manhole structures where manhole lids must be removed to inspect the structure or where sufficient clearance is required to obtain a clear photograph.

Field crews will spend a total of 10 minutes searching for or attempting to access an individual structure. If after 10 minutes the structure cannot be located or accessed, the asset will be noted as either Not Found or Difficult Access. Difficult Access structures will be identified and conveyed to the CITY on a weekly basis for evaluation for assistance in gaining access while working in that area.

Field crews will note any recommendations for resolving access or location issues. Difficult Access and Not Found structures will be reported on a weekly basis via electronic means. The **CONSULTANT** will return to inventory structures as directed by the **CITY** once the structure in question has been located or made accessible by the **CITY**. Difficult Access or Not Found structures will be assessed the same unit rate as structures which are inventoried. Subsequent visits to inventory previously noted Difficult Access or Not Found structures will be assessed the same unit rate for each return visit to the individual structure in the event field inventory crews are not able to access a structure that has been reported as accessible.

The **CONSULTANT** will field inventory those structures that are within public easements. The **CITY** will notify the **CONSULTANT** of structures that do not have permanent easements and will assist in accessing structures outside permanent easements as necessary.

Open channel systems will also be verified or collected by field crews. Open channel systems conveying public storm drainage will be inspected approximately 10 to 15 feet upstream and downstream of closed system structures 15" in diameter or greater. A measurement of channel width and depth will be collected where width represents the top width of the channel and depth represents depth to overflow of the channel for upstream and downstream locations. Channels will be digitized as linear features connecting to closed system structures or outfalls.

The **CONSULTANT** will record rim elevations and calculate invert elevations for all structures within the geodatabase. The source for rim and invert elevations will be scanned source documents as well as interpolated surface elevations derived from the Digital Elevation Model provided by the **CITY**.

2. Approximately 10% of the total number of structures added to the geodatabase through digitizing and field inventory will be identified for resampling of rim elevations. These elevations will be collected using survey-grade GPS receivers accessing the AED base station network or USGS-affiliated virtual reference station network. Vertical accuracy of surveyed rim elevations will be within the published standards for the network utilized.

   The structures to be located with survey-grade GPS will be distributed throughout the collection system and will be representative of the main branches of the collection system. Vertical errors between digitized plans and measured data will be spread amongst the intervening points, unless there is sufficient evidence of a hard break in the data. Surveyed elevations will be noted in the geodatabase for future reference.

Task C: Inventory of Receiving Streams

1. The **CONSULTANT** will conduct a stream walk along all accessible branches of the receiving streams in the work area with AED staff and the Southeastern Natural Sciences Academy. The stream will be accessed via sanitary sewer easements as well as road crossings. The stream will be evaluated at intervals approximately every 1,000 feet. Evaluations will consist of a characterization of bank stability to indicate whether the bank is intact or eroded as well as to note any areas of sediment deposition and overall habitat quality. Photographs of the bank will be taken on both sides of the stream and linked to the inspection location within the geodatabase.

   The protocol for stream assessments will be provided by the **CITY**. Based on the protocol for stream assessments; the **CONSULTANT** will utilize field inventory crews or staff scientists for the stream characterization. The **CONSULTANT** will utilize field inventory crews for stream walk assessments where AED staff or Southeastern Natural Sciences Academy will conduct the stream characterization. The **CONSULTANT** will utilize staff scientists for stream characterizations where assessment protocols and the **CITY** liabilities dictate the expertise of qualified scientists. The **CONSULTANT** will provide staff to support stream walk assessments for a total of sixty (60) days. If additional time is needed to complete this portion of the project, the **CONSULTANT** will extend this time period upon agreement between the **CITY** and the **CONSULTANT**.

2. The **CONSULTANT** will locate outfalls encountered while performing the stream walk that have not previously been entered into the geodatabase by the **CITY**. Attribute information as included in the AED outfall inspection format will be collected and attached to the outfall location in the geodatabase.

3. The **CONSULTANT** will review FEMA cross-sections as identified by the **CITY** to determine if they are stable or evolving. Cross section reviews will include the establishment of reference stations located with x, y and z coordinates. Reference stations will be established with four-points of reference (two top of bank and two bottom of bank sections) for the in-channel section.

4. The **CONSULTANT** will prepare a characterization summary of the receiving stream based on observations during the stream walk and cross-section survey. The **CITY** will provide the characterization summary protocol.

   Locations where evaluations were conducted will be entered into the AED geodatabase and photographs will be linked to point features representing evaluation locations. The **CONSULTANT** will prepare a written three (3) page technical memo summarizing the stream characterization. The technical memo will references the AED geodatabase and will include GIS graphics supporting the assessment protocol.

Task D: Rain Gauge Installation

1. The **CONSULTANT** will review proposed rain gauge locations and provide recommendations for alternate sites. Sites will be evaluated for relative location to other stations, accessibility, aerial obstructions and possible reuse as a long-term sampling and/or monitoring location. During the evaluation, the **CONSULTANT** will visit each proposed rain gauge location as well as any locations being proposed as alternative sites.

2. The **CITY** will provide the **CONSULTANT** with specifications for the make and model as well as the preferred provider of the rain gauges to be installed. The **CONSULTANT** will prepare a plan for installing the rain gauges that complies with manufacturer recommendations. The **CONSULTANT** will install a total of ten (10) rain gauges within the work area and will provide monitoring of the gauges throughout the duration of this Phase of the project. The **CONSULTANT** will visit each monitoring station at least quarterly to inspect the station and remove any accumulated debris.

3. The **CITY** has requested the use of rain gauges that utilize wireless or cellular data transfer of monitoring results. The **CONSULTANT** will configure receipt of the wireless or cellular data to be relayed to the **CITY** for real-time processing and display. In the event wireless or cellular data access cannot be obtained for a rain gauge based on lack of reception in the area of the gauge; the **CONSULTANT** will visit the location on a weekly basis to retrieve monitoring data and verify the working condition of the gauge.

Task E: Project Coordination and Deliverables

1. The **CONSULTANT** shall endeavor to maintain a web-based GIS application for displaying the status of inventory data collection and resolving questions with the entire project team. The GIS application should provide password-secured access for the **CITY**.

2. The **CONSULTANT** will meet with the **CITY** onsite or by agreed upon electronic means available once per month to review project status and to coordinate upcoming work tasks.

3. The **CONSULTANT** will deliver all GIS inventory data in the AED geodatabase format along with all documents and photographs linked to the corresponding assets. Incremental data deliveries will be made based on the portions of the basins identified during Task B 1.
4.

Phase 2: Modeling Effort

Overview: The CONSULTANT will assist the CITY in developing simple hydraulic capacity models of the receiving system documented in Phase 1. This section is not currently defined depending on the extents of information collected in Phase 1.

Phase 3: Water Quality Monitoring Effort

Overview: The CONSULTANT will assist the CITY in developing stream water quality analysis techniques and assist in the execution of these techniques and collection of data. This section is not currently defined depending on the extents of information collected in Phases 1 and 2.

Augusta, GA Engineering Department

CONTRACTOR'S QUALIFICATIONS

CONSULTANT SERVICES AGREEMENT
PROFESSIONAL SERVICES TO ASSESS & ANALYZE WATERSHEDS, INVENTORY STORMWATER FACILITIES & STORM CONVEYANCE
PROJECT NUMBER: 328-041110-211828002

WK DICKSON

June 21, 2013

Ms. Geri A. Sams
Director
Augusta Procurement Department
530 Greene Street - Room 605
Augusta, GA 30901

RE: RFQ Item #13-149 Professional Services to Assess & Analyze Watersheds, Inventory Stormwater Facilities & Storm Conveyance for Engineering Department

Dear Ms. Sams:

Augusta has tremendous opportunities and challenges in the future. The confluence of the capacity-use requirements, continued sustainable growth in the region, and the current economic climate only serves to highlight the value of our precious water resources.

WK Dickson's team has proven leadership and experience with water resources in the Southeast. Our team has been specifically built to serve Augusta Utilities. We bring the perfect blend of personal, cost effective service with a wide range of experience to your door step. Our qualifications include:

- Regional Experience – Since 1929 W. K. Dickson & Co., Inc. has been a leader in the development of asset inventory solutions. Our team has become a go to resource for clients in the region and continues today in plowing new ground in the developing practices of the industry. Our development of new and innovative technologies is a cornerstone of our client service.
- GIS Knowledge – WK Dickson has worked hard to develop and upgrade your GIS infrastructure to be useful and adaptable to the technology changes in the industry. Our commitment to keeping Augusta ahead of the curve is demonstrated in our past services.
- Leading Experts – Our professionals are constantly improving with the industry and bringing these new and efficient ideas to our clients. From our mobile applications to customized technical approaches that are highlighted in our proposal, we work hard every day to be a trusted advisor for Augusta.
- Local Commitment – Since 2006, we have been here side by side helping Augusta attack some of the more difficult issues. Our commitment to serving this area has remained steady and consistent.

After reviewing the enclosed information, you will find that WK Dickson can create value for you. We can provide more detail about our recommended approach and potential solutions upon request. Please call me directly at 706-722-3479 with any questions you may have.

Sincerely,

W.K. Dickson & Co., Inc.

William G. Wingate III, PE
Vice President

1450 Greene Street Suite 225 | Augusta GA 30901 | Tel 706.722.3479 | Fax 706.722.6773 | wkdickson.com

TABLE OF CONTENTS

EXECUTIVE SUMMARY

WK Dickson is a multi-discipline Community Infrastructure firm with a long history of providing high-quality, client-focused solutions to meet the needs of communities, including Augusta, GA! Based from our regional office in the Enterprise Mill; WK Dickson has worked with Augusta Utilities and Engineering Departments on numerous projects , including projects very similar to the current effort to Assess and Analyze Watersheds and Inventory Stormwater Facilities and Storm Conveyance Systems.

WK Dickson's project team will be led by Michael Cameron, GISP. Michael has worked with Augusta Utilities Department staff to migrate the legacy water and sewer GIS data into current ESRI geodatabases. As part of this effort, numerous enhancements to the daily operations have been made including the development of mobile data collection routines and automated processes for data maintenance and analysis. Michael also led the highly successful inventory of the Fort Gordon wastewater collection system prior to acceptance by Augusta Utilities Department in 2009. That project not only involved a detailed scope of asset inventory, but also a highly complex and expedited schedule with high demands on meeting delivery dates and budget. Michael will provide the same project management for this inventory and watershed assessment.

Central to the success of every utility inventory and watershed project WK Dickson undertakes is a robust project approach. WK Dickson began providing similar stormwater services to our clients in the early 1990's. In the decades since, we have been highly successful by applying the lessons learned and always looking for opportunities to increase efficiency and quality.

On this project, WK Dickson will utilize the latest in Mobile GIS technology. We will deploy the data model AED approves for this project into a Internet Mapping Application complete with basemap and adjacent utility data. This will give our field crews a complete picture as they navigate the basin, and will also allow the field crew to collect the required data directly in the same geodatabase that will be delivered to AED. In fact, WK Dickson will also provide access to the Internet Mapping Application to AED staff working on the project to assist in communicating project status and fast resolution of problem areas. WK Dickson has assembled a team including local field data collection crews and watershed analysis experts from Nutter and Associates. This team is uniquely qualified to rapidly collect, analyze and make recommendations for water quality improvements and overall stormwater management strategies that AED can implement immediately.

WK Dickson's reputation for high-quality deliverables is no accident...We are able to provide the level of accuracy and completeness because of our attention to detail and our intense focus on integrating our Quality Control Process in every step of the project. Our Quality Control Process is not a final checklist to fill in before sending out deliverables, it is a series of checks, automated routines and data entry protocols that reduce the possibilities for errors to be introduced.

WK Dickson understand the significance of this work to the overall success of the Stormwater Management Program. We have helped numerous clients meet these same challenges throughout the southeast. We have helped Augusta with similar needs on both water and sewer utility infrastructure. We remain capable, and eager to continue working with you to inventory and assess the stormwater infrastructure as well!

COMPANY OVERVIEW

WK Dickson is an Engineering News Record Top 500 community infrastructure consulting firm specializing in the growth of municipalities since 1929. Since that time, we have provided professional planning, design and engineering services to both public and private sector clients, and have been recognized for our strength and quality in the community infrastructure field. The firm has maintained the policy of providing the highest quality of professional engineering services to our clients for more than eight decades. With 125 individuals on staff, WK Dickson maintains seven strategic office locations in Georgia, South Carolina, and North Carolina.

Our philosophy is simple. We become an extension of the client we serve through hands-on management and interaction. We believe in delivering a project team of core individuals with a support staff tailored to each project. We also work within a design-center concept, thereby allowing the vast resources of the company to be utilized for any project, regardless of geographic location. The proven success of our philosophy is evidenced by our clients and their satisfaction with the work we provide. We are proud of the fact we maintain a 95% client retention rate.

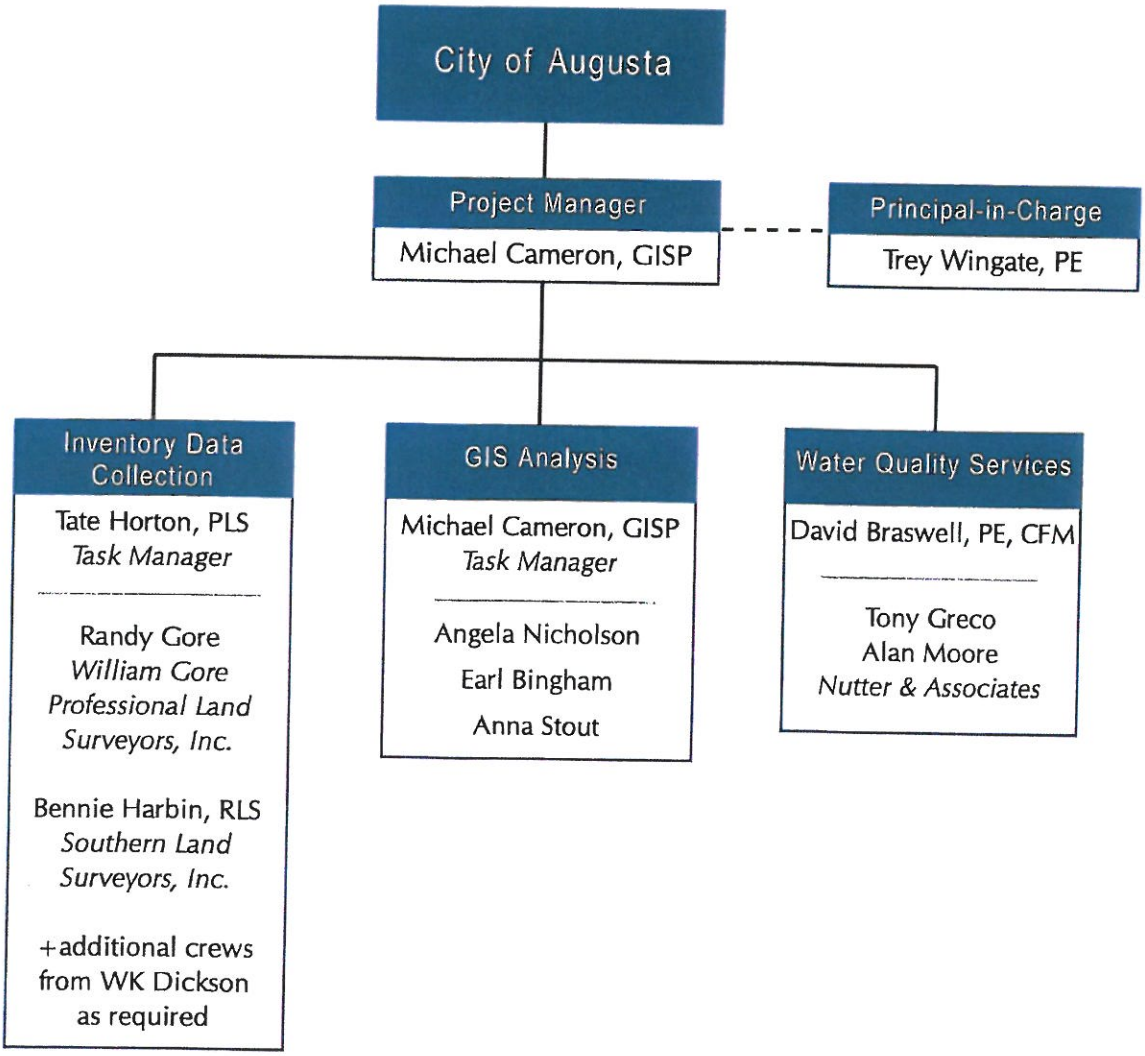
Since the firm's inception, WK Dickson has grown to operate seven regional offices strategically located throughout the Southeast. The company maintains offices in Charlotte, Hickory, Raleigh, and Wilmington, North Carolina; Columbia, South Carolina; Augusta, and Atlanta, Georgia.

Our Geomatics Group is made up of expertly trained stormwater inventory and GIS professionals that specialize in field inventory of utilities using various GPS methods, procedures and accuracies as well as collection of the associated attributes into a GIS geodatabase for municipal infrastructure needs.

WK Dickson was the first company in the southeast to provide stormwater inventories to municipal clients and since then, we have remained the industry leader in field inventory projects. We have inventoried over 1,200,000 drainage system attributes since the early 1990s. Our creative combination of experience and personnel will ensure the City of Augusta the timely and cost-effective completion of this project. We are committed to providing you with highest quality of professional services to support this long-term assignment.

PROJECT TEAM & THEIR SUCCESS WITH SIMILAR PROJECTS

WK Dickson has assembled a highly qualified team of stormwater professionals to provide the City of Augusta with professional services to asses and analyze watersheds, inventory stormwater facilities and storm conveyance for the Engineering Department. Michael Cameron, GISP, will be the project manager. His many years of project management and local experience will provide the insight and background needed to lead the project team and coordinate with Augusta Engineering Department Staff on this important pursuit. Additional information on the WK Dickson project team can be found in the following organization chart and in the resumes that follow.



Michael Cameron, GISP

Project Manager

Michael has 17 years of experience in local government and utility GIS applications. He is a graduate of the University of South Carolina where he received a bachelor of science in geography. Michael has extensive experience working with municipal and state clients to implement GIS solutions using industry standard technology from Environmental Systems Research Institute, Inc. (ESRI). He is experienced in all aspects of project development including, planning and integration, data collection and conversion, application development, integration with Internet and intranet applications, and technical assistance following implementation. In addition, Michael has worked with clients to tailor GIS solutions to meet organizational needs, design custom databases, collect data using a broad range of techniques, and integrate data into a variety of applications. Recent projects include:

GIS Services for Augusta Utilities Department — Augusta, GA: GIS manager involved in migrating departmental GIS data into a geodatabase format that will allow for the utilization of the editing, analysis and integration functionality available in the ESRI geodatabase architecture. As part of this migration, WK Dickson has designed geodatabases for both water (11,729 valves, 3,870 hydrants, 27 elevated tanks, 8,872 junctions, 284 reducers or 972 miles of water main) and sewer (1,038 manholes or 42 miles of sewer main) utilities as well as converted existing shapefile data into the newly built geodatabases. Once the data conversion was complete, the project featured a data maintenance workflow for editing data in the field. The project also involves the custom development of tools and procedures for specific tasks as identified by AUD as part of an on-call services agreement.

GIS Services for Fort Gordon Utilities — Augusta, GA: GIS Manager for a complete GIS-based inventory of the Fort Gordon Base water and sewer infrastructure that was recently added to the Augusta Utility Department system. GIS inventory included existing water and sewer utility features to provide knowledge for maintenance and management of the utility resources. The project also included a field inventory, location for approximately 1,300 sewer manholes, 50 pump stations and 600 cleanouts as well as GIS database development. During the project the WK Dickson team coordinated exclusively with Augusta Utilities Department to collect data for difficult access structures.

Watershed Inventory and Master Plan — Greenville, NC: Michael's involvement in this multi-phase project centered on management of geodatabase design, Standard Operating Procedure Manual development and field inventory portions of the project. Michael provided oversight and technical guidance in database design to meet the future needs of the City, while also establishing a protocol for data collection that will be easily replicated. Michael oversaw implementation of field inventory procedures including integration of the VRS system for survey-grade GPS location and geodatabase editing procedures within the field.

Joint Municipal Water and Sewer Commission GIS Development — Lexington, SC: This project has included a large-scale data development effort to locate and inventory existing water and wastewater infrastructure throughout the Commission's service area. Sanitary sewer data has been collected in a combined approach utilizing mapping and survey-grade GPS as well as conversion of existing record drawings. Water utility infrastructure has been located with mapping-grade GPS and conversion of record drawing information. JMWSC intends to integrate the GIS data with work order and asset management software as well as continue hydraulic modeling of both utilities using the newly developed GIS data.

Academic Background
BCE, Civil Engineering; Georgia Institute of Technology

Professional Registrations
Professional Engineer: GA, NC, SC

Certified Floodplain Manager

GSWCC Level II - Certified Design Professional

Trey Wingate, PE

Client Manager, Principal-in-Charge

Trey has over 20 years of municipal design experience in the civil engineering field including numerous municipal utility infrastructure projects throughout the Southeast. He has served as a principal-in-charge and project manager throughout his career, utilizing a hands-on approach to assist clients in getting their projects completed. He has extensive experience in municipal sewer and wastewater design along with a broad expertise encompassing site development, storm drainage, hydrologic and hydraulic analysis of dams, water and sewer lines, paving, roadway, schools, parks, and airport design. The bulk of his experience over the last twelve years has been in assisting local governments and various public service districts solve their needs. His experience with assisting municipal clients with aging infrastructure issues has helped him develop a deep understanding of rehabilitation practices. Recent project experience includes:

Wilkinson Gardens Stormwater Improvements — Augusta, GA: Principal In Charge for project to evaluate the existing stormwater drainage system within a 200-acre subdivision in the Rock Creek Basin of Augusta, provide surveying and engineering services related to pond improvements within the Hyde Park neighborhood. Services include field investigation, survey, watershed evaluation, mapping and providing a construction cost estimate for this regional stormwater pond serving 60 acres. Project included providing plans and specifications as well as construction administration and construction observation. WK Dickson has been working with the City to come up with a plan to help alleviate flooding in the Hyde Park neighborhoods, which is downstream from Wilkinson Gardens.

Peachtree Ridge Park Drainage Design — Gwinnett County, GA: Provided stormwater design, construction documents, permitting, and construction administration for a new community park in Gwinnett County named Peachtree Ridge Park. This 155-acre park site has a lake that sits on the property and is located at the intersection of Wildwood Road and Suwanee Creek Road.

4th, 5th, & 6th Street Interceptor Replacement — Augusta, GA: Project Manager for an SSES evaluation and interceptor replacement for this critical area in downtown Augusta. The evaluation included CCTV, manhole inspections, flow isolation, temporary flow monitoring and repair prioritization. Due to our evaluation and concerns about the potential dynamic stresses from the nearby railroad, we worked with AUD to collapse the existing line and replace it with a new 16-inch ductile iron pipe. The project included repairs to multiple manholes as well. The project successfully reduced infiltration and exfiltration issues in the area while seamlessly coordinating with the railroad.

Sky Valley Royal Investors Dam Evaluation — Sky Valley, GA: Redesign, permitting, and coordination of sediment remediation for dam failure between municipal and private parties. The existing dam failed in a 2005 fall storm on a 3 acre impoundment, and the client requested our assistance in corrective actions to satisfy a court order for repair and corrections. The existing dam was approximately 13' tall and had a primary spillway using a riser barrel with a 60" CMP Barrel.

Academic Background
BCE, Civil Engineering; Georgia Institute of Technology

Professional Registrations
Professional Engineer: GA, NC, SC

Certified Floodplain Manager

GSWCC Level II - Certified Design Professional

David Braswell, PE, CFM

Senior Project Engineer

David has over 32 years of experience in water resources and stormwater management projects. He currently serves on the Basin Advisory Committee for the MNGWPD where he stays informed of current and proposed District, EPD and EPA rule changes and BMP and TMDL implementations. During his career, he has served as project manager or project engineer on over 30 Flood Insurance Studies for FEMA throughout the Southeast and has been a project manager on stormwater projects in Metro Atlanta for over 27 years. Typical projects have included pipe replacements, detention pond assessments and retrofits, dam-break studies, water supply studies, water quality monitoring, rainfall and stream-flow measurements, spillway designs, and the design of stormwater detention facilities and BMPs.

Most recently, David has been the program manager for the Atlanta Stormwater Group for WK Dickson. During this time, David has been the project manager for numerous stormwater projects within the District. Also, he spent four years as the Project Manager for the Columbus, Georgia engineering on-call contract, where he was responsible for preparing project scopes, budgets, work schedules, permitting and QA/QC on a variety of major city roadway and drainage projects. This contract included monthly project meetings with city staff and updates for the Mayor, City Council, and City Manager.

Powder Springs Stormwater Utility Fee Review — Powder Springs, GA: Assisted the Powder Springs Public Works Director and Community Development Director with a review of their proposed SW Utility fee. Reviewed proposed staff and expense costs based on previous history and future estimates to meet proposed level of service. Attended Council work session with City Staff, Mayor and Council Members to discuss findings and answer questions on current and proposed regulations.

Glen Errol Subdivision Detention Pond Assessment — Sandy Springs, GA: Project Manager for the study to evaluate the failure and condition of the existing structure. Prepared hydrologic models of the basin to analyze the existing and proposed function of the pond and prepared construction plans for the recommended improvements to restore the integrity of the structure and to retrofit the pond to maximize water quality benefits.

Jeffery Stormwater Improvements — Columbus, GA: Columbus recently experienced the collapse of a stormwater pipe which drained a large subwatershed in a fully built out residential area of town. Working with the City, residential property owner, attorneys, contractor, and surveyor, WK Dickson engineers field located a new stormwater drainage routing through a large estate property and interacted with all parties in the easement acquisition, residential property improvements, and construction of the project. Drainage was sited to minimize property disturbance and to allow the owner to benefit from over $150,000 of residential property improvements as a portion of the easement compensation.

Cherokee County Stormwater Projects — Cherokee County, GA: Project Manager for the design of stormwater BMPs and detention facilities for the multi-year expansion projects at the airport in compliance with the post development stormwater requirements of the MNGWPD. In addition to water quality, channel protection and detention, the airport is required to meet 2-year volume controls as outlined in the Etowah Habitat Conservation Plan.

Academic Background
BCE, Civil Engineering; Georgia Institute of Technology

Professional Registrations
Professional Engineer: GA, NC, SC

Certified Floodplain Manager

GSWCC Level II - Certified Design Professional

Earl Bingham, EI

Designer

Earl has more than seven years of experience in local government and utility GIS applications. Earl has extensive experience creating, editing, managing, and analyzing GIS utility information both as a consultant and a municipal employee. Earl has provided staff level engineering support on stormwater management projects. He has performed inventory of stormwater pipes, structures, and BMPs using handheld GPS, flow testing, dye testing, and CCTV for the purpose of updating the stormwater GIS maps. Also, he has performed inspections of stormwater BMPs and assisted with illicit discharge investigations, water quality testing, and outfall inspections. Earl has assisted with plan review, stormwater system analysis, and other engineering tasks. Earl is proficient with ArcGIS.

Watershed Inventory and Master Plan — Greenville, NC: Earl continues to serve in multiple roles as this project continues. Initially, Earl was the lead GIS Technician during the field inventory and database development. Earl conducted field observations and worked with the project team to refine Standard Operating Procedures (SOP) for the fieldwork. Following field data collection, Earl has been heavily involved in hydraulic analysis and development of the Capital Improvement Plan.

*Stormwater Inspection and Inventory — University of North Carolina, Chapel Hill, NC: Earl performed inventory of stormwater pipes, structures, and BMPs located on the UNC Campus using handheld GPS, flow testing, dye testing, and CCTV for the purpose of updating the stormwater GIS map. He created, edited and managed GIS information using ArcMap for the UNC Stormwater utility, which contains 43 miles of pipe and 4500 structures spread over 5.5 square miles. Also, he created inspection forms for UNC Grounds personnel and stormwater engineers to fill out during routine maintenance of stormwater structures. Earl was also responsible for inspections of stormwater BMPs, including vaults, hydrodynamic separators, and bioretention areas. He compiled the UNC Stormwater Design Guidelines, using existing state and local guidelines and input from the UNC Stormwater Engineer. Earl has also assisted personnel in the Environment Health and Safety Department with illicit discharge investigations, water quality testing, and outfall inspections on a weekly basis and assisted the UNC Stormwater Engineer with plan review, stormwater system analysis, and other engineering tasks.

Sewer System Evaluation Survey — Eden, NC: Earl assisted WK Dickson survey personnel with smoke testing 70,000 linear feet of sanitary sewer pipes with the goal of identifying and eliminating cross-connections with the stormwater system. Earl also used an ArcGIS Mobile tablet application to collect sanitary sewer manhole inventory data which is currently being used by WK Dickson to perform capacity analysis modeling. Earl is also a NASSCO certified on MACP, PACP and LACP inspection protocols.

Experience prior to joining WK Dickson

Academic Background
BS, Civil Engineering; North Carolina State University

Professional Registrations
Engineer Intern: NC

Angela Nicholson

Senior GIS Analyst

Angela has over 27 years' experience working with AutoCAD and GIS products. She has worked with the U.S. Navy for the Charleston Naval Weapons Station Project, which entailed survey grade mapping to match GIS locations and create lease boundaries. She has also worked on numerous projects for environmental design, site design, stormwater management, surveying, utility design and location, water resources and wastewater design. She has worked on numerous sanitary sewer evaluation study projects and is certified for NASSCO's pipeline and manhole assessment program. Angela is responsible for CAD conversion and design, data analysis and geodatabase design and collection. She currently serves as GIS Analyst on GIS/GPS inventory and mapping projects. Angela is a unique member of the WK Dickson GIS team due to her extensive background in engineering design and drafting. Her extensive knowledge of stormwater, water, sewer, and transportation engineering combined with the GIS expertise provide a highly unique skill set for utility oriented clients.

GIS Services — Augusta, GA: During this project, Angela was involved in migrating legacy shapefiles for water and wastewater assets into an enterprise geodatabase structure to allow utilization of the editing, analysis and integration functionality available in the geodatabase. The geodatabases were developed to take advantage of subtypes with domains established for common values. This simplified the use of coded values and "pull down" style menus in both the field and office data management tasks. Each geodatabase was also designed with a geometric network to establish system connectivity.

Watershed Inventory and Master Plan — Greenville, NC: Angela served as the lead GIS Analyst on the project and facilitated the processing of all geodatabase and survey field data to produce a Master Stormwater Geodatabase. Angela reviewed field collected attributes and ran a series of analysis to verify and populate attributes based on surrounding datasets such as parcel addresses, easement boundaries, hydrography and hypsography. Angela also verified system connectivity and coordinated the resolution of difficult access structures between City staff and WK Dickson field crews.

Illicit Discharge Detection and Elimination (IDDE) Program — Richland County, SC: Richland County contracted with WK Dickson to review, evaluate and update its Illicit Discharge Detection and Elimination (IDDE) Program, which is required as a component of the County's National Pollutant Discharge Elimination System (NPDES) Stormwater Permit. Angela's work on this project included the production of mapping products to support the reporting and documentation components of the project. Additionally, Angela worked to develop field data collection forms as well as assisted in compiling existing GIS data on Richland County's stormwater infrastructure and updating this information with newly acquired field data.

Water and Sewer GIS Inventories — Lancaster, SC: Angela worked with City staff to develop water and sewer Geodatabases for maintaining utility infrastructure data for the City. The project included the building of linework connectivity between sewer utility features and population of attributes derived from field inspections. Angela also conducted training in the use of GIS software and data and provided recommendations for the completion of both water and sewer utility systems was also part of this project.

Academic Background
AS, Telecommunications; Midlands Technical College

AS, Electronics Engineering; Midlands Technical College

Anna Stout

GIS Analyst

Anna is a graduate of Clemson University where she received a Bachelor of Science in Natural Resources and of North Carolina State University where she received a Master of Science in Forestry. Anna is experienced with planning database schemas that account for current and future data collection needs and incorporate rules that help maintain the integrity of attribute data. In addition, Anna is experienced in creating and maintaining ArcGIS server applications that allow for mobile and online data collection and editing. Anna is a recent addition to the WK Dickson Team and will be facilitating the mobile application development and administering map services critical to the efficient inventory of the stormwater conveyance systems. Since joining the WK Dickson Team, Anna's recent projects include:

Watershed Inventory and Master Plan — Greenville, NC: Anna work on this project included final QA/QC reviews of GIS database deliverables and final changes to the geodatabase schema. Anna also assisted in developing the Stormwater Inventory Standard Operating Procedure Manual for open and closed stormwater conveyance systems.

Internet Mapping Application for Public Works Data — Harrisburg, NC: Anna developed an enterprise solution for publishing GIS data from Harrisburg's Public Works Department and providing online editing and data access across a variety of platforms. Anna utilized a combination of ArcGIS for Server online to meet the needs of mobile devices including Android, i-OS and Microsoft Windows operating systems.

Mobile and Web Applications for the Glass Factory Basin — Augusta, GA: In support of the ongoing sanitary / storm separation project within the Glass Factory Basin in Augusta, Anna utilized ArcGIS for Server to publish an Internet Mapping Application for managing project data and facilitating communication between Augusta Utilities Augusta Engineering staff. Anna also developed a mobile application for collecting smoke testing data and uploading newly collected smoke test locations, attributes, and photos to the Internet Mapping Application. Anna also incorporated supporting GIS information (sewer and storm water infrastructure, links to As-Built drawings, aerial imagery).

Academic Background
MS, Forestry; North Carolina State University

BS, Natural Resources; Clemson University

Robert "Tate" Horton, PLS

Data Collection Manager

Tate is a registered land surveyor in Georgia, South Carolina and Alabama with more than 15 years of experience in surveying and mapping services. Tate's educational background includes Bachelor of Science degrees in both Civil Engineering and Survey & Mapping. He is certified in NASSCO's MACP, PACP and LACP inspection protocols. Tate is responsible for surveying services from the Augusta regional office of WK Dickson and has been involved in a wide range of projects throughout the Augusta – Richmond County area as well as throughout the southeast. His familiarity of the local area from years of surveying is valuable in understanding the drainage basins for Richmond County and options for collection of data.

Most recently, Tate has served as WK Dickson's Team Lead for Sanitary Sewer Evaluation Study projects utilizing his experience as a certified NASSCO inspector and conventional surveying background to conduct structure inspections and collect MACP data utilizing WK Dickson's Mobile GIS applications. Tate will serve as the inventory data collection task manager for this project and will lead inventory crews in the collection of stormwater conveyance assets utilizing WK Dickson's Mobile GIS solutions for asset inventory and collection. As a registered surveyor in Georgia, Tate will also provide review of survey-grade locations and insure compliance with accuracy standards. Recent projects Tate has been involved with include:

4th, 5th, & 6th Street Interceptor Replacement — Augusta, GA: Lead surveyor for an SSES evaluation and interceptor replacement for this critical area in downtown Augusta. The evaluation included CCTV, manhole inspections, flow isolation, temporary flow monitoring and repair prioritization. Due to our evaluation and concerns about the potential dynamic stresses from the nearby railroad, we worked with AUD to collapse the existing line and replace it with a new 16-inch ductile iron pipe. The project included repairs to multiple manholes as well. The project successfully reduced infiltration and exfiltration issues in the area while seamlessly coordinating with the railroad.

GIS Services for Fort Gordon Utilities — Augusta, GA: Lead surveyor for a complete GIS-based inventory of the Fort Gordon Base water and sewer infrastructure that was recently added to the Augusta Utility Department system. GIS inventory included existing water and sewer utility features to provide knowledge for maintenance and management of the utility resources. The project also included a field inventory, location for approximately 1,300 sewer manholes, 50 pump stations and 600 cleanouts as well as GIS database development. During the project the WK Dickson team coordinated exclusively with Augusta Utilities Department to collect data for difficult access structures.

Sewer System Evaluation Survey — Eden, NC: Part of the survey team responsible for smoke testing 70,000 linear feet of sanitary sewer pipes with the goal of identifying and eliminating cross-connections with the stormwater system. Tate also used an ArcGIS Mobile tablet application to collect sanitary sewer manhole inventory data which is currently being used by WK Dickson to perform capacity analysis modeling.

Academic Background
BS – Civil Engineering, Southern Polytechnic State Univ.
BS – Surveying and Mapping; Southern Polytechnic State Univ.

Professional Registrations
Registered Land Surveyor: GA, SC

Tony Greco

Ecosystem and Hydrologic Sector Leader

Nutter & Associates
environmental consultants

Mr. Greco is an aquatic ecologist and hydrologist focusing on water quality assessment, watershed planning, water resource projects, aquatic biology, and wetland ecology. Tony has worked for public entities, private landowners, and industry in Georgia, Florida, North Carolina, South Carolina, and Tennessee conducting stream and wetland biological and water quality assessments, wetland delineations, Section 404 permitting, compensatory mitigation plan development and implementation, threatened and endangered species surveys, vegetation monitoring, geomorphological stream and wetland assessment, and GIS analysis. He has been the principal project manager and report author on several complex projects involving a variety of disciplines, including aquatic ecology, water resources, and hydrology. He is also proficient with data analysis and management and GIS computer applications.

Currently, Tony is responsible for the oversight, coordination, management, and implementation of several ecologically oriented projects in the states of Georgia, Florida, and Texas. As a part of these projects, Mr. Greco regularly conducts water quality sampling, benthic macroinvertebrate and fish collection and identification, and ecological assessment. In addition to the development and implementation of Georgia EPD Watershed Assessment and Protection Plans, Mr. Greco is the project manager for the International Paper Combined Effluent Distribution Project, which entails comprehensive surface and ground water quality monitoring, vegetation and aquatic biological assessments, soil evaluations, and hydrologic monitoring as specified by the Florida Department of Environmental Protection.

Watershed Assessment and Protection Plans — Georgia: Tony has successfully **managed seventeen Watershed Assessments and Protection Plans within Georgia between 2006 and 2013**. He is the principal author and quality control supervisor on all projects, as well as participating in water quality monitoring, agency coordination, and City/County communication. Completed and/or in-progress Watershed Assessments and Protection Plans include the Cities of Kingsland, Richmond Hill, Ty Ty, Thomasville, Camilla, Thomson, Toccoa, Cornelia, Fitzgerald, Dublin, Reynolds, and Alma, and Jones and Twiggs Counties.

Thomasville Watershed Assessment and Protection Plan — Thomasville, GA: Developed and implemented the Monitoring Plan for the City of Thomasville, which contained six sample locations surrounding the City. Following data acquisition, prepared both the Watershed Assessment and Watershed Protection Plan for submittal to GA EPD. The Watershed Protection Plan established on-going collaboration with Thomas University to assess the water resources within the City. The Plan also established a stringent Stormwater Management Ordinance for new development within the city limits. Currently, Nutter & Associates is conducting long-term monitoring as a part of the Watershed Protection Plan.

Sediment Assessment Projects — Georgia: Project Manager on several legal sediment studies examining the impacts of accelerated sedimentation on waters of the U.S., including the quantification of sediment deposition, source assessment, and contemporary fluvial sediment transport. Data collection utilized standard scientific sampling methodologies, GPS field mapping, and advanced GIS analysis to model sediment deposition and discriminate historic versus contemporary sediment impact. Sediment assessments have been conducted near the Cities of Blue Ridge, Augusta, Clayton, Buford, and Elberton.

Academic Background
MS, Biology/Ecology & Environmental Biology; Applachian State University

BS, Biology/Ecology & Environmental Biology; Applachian State University

Professional Certifications
Professional Wetland Scientist #2298

Alan Moore

Project Scientist - Stream and Wetland Ecologist

Nutter & Associates
environmental consultants

Mr. Moore is an ecologist with 8 years of experience focusing on watershed and stream assessment, benthic macroinvertebrate and fish ecology, and ecological restoration design out of the Nutter and Associates field office in Asheville, North Carolina. He has worked in both the public and private sector managing biological, water quality, and surface hydrology studies in support of watershed assessments, research, ecological restoration, environmental impact statements, in-stream flow studies, endangered species management, and stormwater master plan projects. He has written numerous scientific reports, mitigation monitoring reports, watershed planning documents, and NEPA and SEPA documents. Alan is proficient with topographic survey techniques, ArcGIS, habitat evaluations, fish and macroinvertebrate sampling, vegetation monitoring and survey, and hydrologic and water quality monitoring.

Alan is assisting with the management and implementation of several watershed assessments and watershed protection plans throughout Georgia. Alan has managed watershed assessments and local watershed plans throughout North Carolina including watershed assessments conducted for the North Carolina Ecosystem Enhancement Program (NCEEP) . As part of these planning efforts, Alan was responsible for meeting with stakeholders to develop assessment priorities, field data gathering, report writing, and presentation of watershed assessment findings to stakeholders in public forums.

319 Grant Watershed Planning Review — Athens-Clarke County, GA: Reviewed existing watershed planning and assessment methodologies currently being utilized by Athens-Clarke County land use planners. Provided recommendations for the development of comprehensive watershed assessment and inventory techniques that meet the objectives of the 319 grant proposal.

Fishing Creek Local Watershed Plan — Granville County, NC: Staff Scientist for NCEEP local watershed plan. Responsible for conducting aerial photo analysis and reviewing NCDWQ water quality data to identify and prioritize sub-watersheds for riparian corridor assessments. Coordinated field crews for conducting riparian corridor, stream habitat, and morphological assessments.

Soco Creek Watershed Plan — Jackson County, NC: Project Manager for the watershed assessment of Soco Creek. Coordinated the collection and identification of stream macroinvertebrates to determine baseline watershed conditions. Conducted stream habitat and morphological assessments throughout the watershed. Defined water quality standards and established measurable goals for improving water quality and in-stream habitat. Recommended new pollution limits for designated uses based on the current and future needs of the community. Responsible for summarizing field results and prioritizing restoration, preservation, and BMP needs. Lead report writer and responsible for presenting data in a public forum to the Eastern Band of Cherokee Indian Tribe.

Indian and Howard's Creek Watershed Assessment NCEEP — Lincoln County, NC: Task manager responsible for implementing watershed planning initiatives including prioritization of stream and wetland restoration, riparian corridor preservation, and stormwater treatment BMPs. Conducted field assessments of all potential stream and wetland restoration sites, preservation areas, and BMP opportunities. Performed geomorphic surveys on all potential stream restoration sites and evaluated survey data to assess stream condition. Implemented a GIS database of watershed assessment projects. Management duties included coordination with state agencies, land owners, and project leader for stream and wetland assessment teams.

Academic Background
MS, Biology/Aquatic Ecology; Appalachian State University

BS, Biology; Western Carolina University

Southern Land Surveyors, Inc.

Conventional Survey Collection

Southern Land Surveyors, Inc. was was founded in 1999 as a partnership and incorporated in 2003. Ther firm's professionals have over 35 years of experience. It's founder and president, Bennie Harbin, is a Registerered Land Surveyor in the State of Georgia. The firm has the capability to provide three full field survey crews equipped with Total Stations and GPS equipment.

Southern Land Surveyors provides the following survey services:

- Commercial, industrial, and residential
- Subdivision layout
- General boundary surveys
- As-built surveys
- Utility location and layout
- Construction Staking
- Topographic surveys and elevation certificates

Southern Land Surveyors, Inc.
4571-A Cox Road
Evans, GA 30809

Bennie Harbin, RLS

Registered Land Surveyor

Mr. Harbin has been a Registered Land Surveyor in the State of Georgia since 1971. He currently serves as President of the Firm. Mr. Harbin is a member of the Surveying and Mapping Society of Georgia. Work experience follows below:

1996 to Present: Southern Land Surveyors, Inc.; As President and Registered Land Surveyor, Bennie is involved in boundary surveying, ALTA, ACSM As-Built surveys, topographic surveys, elevation certificates, including elevation studies, for residential, industrial, commercial, utility and municipal projects.

1988-1996: Georgia Power Company & Liberty Technical Services; Technical Services Manager responsible for providing NDE and miscellaneous testing for projects and clients at Georgia Power, Alabama Power, Gulf Power, Florida Power, Duke Power, Savannah Electric and other generation facilities.

1977-1988: Georgia Power Company construction activities at Plan Hatch and Plant Vogtle. Positions: Civil QC Section Supervisor, Civil Engineering Section Supervisor, Assistant Project Construction Manager. Managed engineering support and quality control for all engineering disciplines.

1960-1977: Georgia Department of Transportation. Highway Project Engineer; General Contracting Company - General Suptendient, EEP Officer and Safety Offcer. Involved in road and bridge construction.

Academic Background
BS, Civil Technology; Southern Tech

Professional Registrations
Registered Land Surveyor:
GA # LS001725

William R. Gore Professional Land Surveyors, Inc.

Conventional Survey Collection

William R. Gore Professional Land Surveyors, Inc. was established on January 1, 1990. The formation of the firm was the result of a reorganization of Brian G. Besson and Associates, P.C., Consulting Engineers; an Augusta engineering firm established in 1968. William R. Gore Professional Land Surveyors, Inc. was organized to separate the surveying and engineering components of Brian G. Besson and Associates, P.C., so as to emphasize each specialty and ensure complete, accurate and economical project completion.

William R. Gore Professional Land Surveyors, Inc. offers general land surveying services in Georgia, South Carolina and North Carolina including, but not limited to, the following:

- Boundary
- Boundary Resolution
- Topographic
- Construction Layout
- Photogrammetry
- Asbuilt
- Utility
- Subdivision Mapping and Computation for Construction Layout
- Commercial
- Highway and Bridge Construction
- Alta/ACSM
- Right-of-Way Acquisition

William R. Gore Professional Land Surveyors, Inc.
1804 Central Avenue
Augusta, GA 30904

William Gore, PLS

Registered Land Surveyor

As President of William R. Gore Professional Land Surveyors, Inc. Mr. Gore provides professional and legal oversight of CAD technician and field crews. He coordinates project assignments, directs field work and research, supervises preparation of survey deliverables, develops budgets, writes legal descriptions, supervises project accounting and invoicing and directs GPS processing. He also develops job proposals and work estimates, trains and mentors staff. He is responsible for client interaction including federal, state, municipal, and city agencies, industrial, commercial and private sector. He is also responsible for development and implementation of quality assurance program. Experience with up to AutoCAD 14 and Soft Desk 8.

Academic Background
AS, Science and Pre-Engineering;
Southeastern Community College

Professional Registrations
Registered Land Surveyor:
GA #LS2502, SC #11811, NC #304

RELATED EXPERIENCE AND SUCCESS

WK Dickson was one of the first firms in the southeast to begin offering GPS-based utility inventory services to our clients. In the decades that have followed, WK Dickson field crews have inventoried countless assets and compiled GIS data in virtually every major format. When the WK Dickson project team begins work on this project, the full value of that previous experience will be fully realized by the Augusta Engineering Department (AED).

A prime example of how that previous experience will be shared with AED is in the utilization of Mobile GIS technology. WK Dickson has invested heavily in the development of Mobile GIS solutions to increase data collection as well as data sharing between field and office staff. Gone are the days of sending an inventory crew into the field with a GPS unit loaded with a crude data dictionary and hard copy maps. WK Dickson has developed a series of non-proprietary mobile applications for inventory and inspection campaigns that utilize web-based map services on a variety of mobile tablets and even Smartphones. Using a cellular data connection, field crews are able to upload inventory data as rapidly as necessary for immediate use by office staff. Similarly, field crews can download virtually any data that is available including parcel boundaries, ownership information and topographic data as if they were sitting in the office.

Our mobile GIS solutions are a radical advancement from the tools used in traditional inventory data collection.

In situations where cellular data access is not available, or instantaneous updates are not necessary, the mobile device provides ample capability to store even large datasets through a process known as caching. This caching process greatly exceeds the limitations of traditional approaches that required feature classes to be copied onto each device. Additionally, new features can be located and attributes edited and the changes are stored locally on the mobile device until a cellular or WiFi connection is available for uploading.

By using domain values for attributes, field crews are able to select values from pick lists rather than having to type in attribute values. This is a tremendous advantage in maintaining consistency among multiple field crews.

These Mobile GIS solutions are a radical advancement from the tools used for inventory data collection even a couple years ago. Not only is the entire project team able to access data as quickly as it is collected, WK Dickson routinely makes project data available for viewing by our clients as part of facilitating project communication and rapid response to coordination concerns.

RELATED EXPERIENCE AND SUCCESS

In the "Project Experience" section of this submittal, we highlight some of the more current projects we have been involved in that are very similar to the work detailed in this RFQ. However in this section regarding our Related Experience and Success, perhaps the best way to illustrate that success is to highlight our technical approach. This approach is the direct product of those decades of inventory and watershed analysis experiences and success.

Through working with clients of all sizes and in various stages of meeting regulatory as well as operational needs; we have learned that the success of a Stormwater Management Program is dependent on three criteria:

1. Thoroughly anticipate the current and future needs
2. Collect the right data, correctly – ***the first time!***
3. Utilize technology to keep pace with data maintenance efficiently and effectively

The WK Dickson Project Team is excited to assist the AED in developing a watershed-based Stormwater Management Program. In review of the Request for Qualifications (RFQ) we acknowledge that the goals include analysis and assessment of watersheds including storm conveyance systems. A key component will also include mapping area-wide storm conveyance structures, control structures and outfalls with the end use objective of developing a Stormwater Utility Fee and Services Program.

THE WK DICKSON APPROACH

Our team understands that in order to develop comprehensive Stormwater Management Program, a thorough knowledge of the entire process is required from data collection through watershed assessments and establishing fee structures with the end goal always being successful implementation. The WK Dickson Approach for this project includes two major phases for each watershed. These phases are Asset Collection and Water Quality Characterization. Within each of these phases, multiple tasks are required to achieve the project goals. The WK Dickson Approach is a systematic process to provide the AED with a roadmap for completing the Stormwater Management Program. The tasks are generally listed in sequence; however, tasks will overlap and in some instances last throughout the duration of the project. Each of the tasks is described below:

Project Management

The cornerstone of a successful project begins with the right project management team. WK Dickson proposes Michael Cameron, GISP serve as project manager for this work. Michael is WK Dickson's GIS Program Manager and has managed numerous projects of similar scope, including projects for the City of Augusta such as the Augusta Utilities Department's GIS Services project and the Fort Gordon Sewer Inventory.

Trey Wingate will serve as the Principal In Charge and the local area client coordinator for this project. Trey and Michael have worked together on a variety of similar projects throughout Georgia and specifically

RELATED EXPERIENCE AND SUCCESS

for Augusta Utilities and Engineering Departments including local drainage studies such as the 4th, 5th, 6th Street I/I Removal Project and the Fort Gordon Sewer Inventory.

Additional quality control on the Water Quality Characterization Services will be provided by David Braswell, PE. Together, their depth of experience provides an asset to the AED that will customize the Stormwater Management Program process to match AED's goals. Key responsibilities for the project management task will include:

- Main point of contact/communication between Project Team and AED personnel
- Assign appropriate resources to meet project schedule
- Maintenance of the project schedule utilizing Microsoft Project
- Maintenance of project budget and tasks using our in-house accounting system
- Development, management and implementation of the Project Work Plan
- Reporting project status from inception through completion via regular reports
- Quality control
- Participate in project closeout and ensure timely completion

Successful management of this project will not only deliver a high quality product on schedule, but also provide the AED with the necessary tools and procedures to develop consistent watershed plans for the entire stormwater conveyance system.

Phase One: Asset Collection Services:

TASK 1 – STORMWATER INVENTORY

Central to the success of any asset collection effort is the standardization of nomenclature and attributes. We have reviewed the proposed GPS data dictionary and required attributes for field collection. The proposed data is consistent with numerous stormwater inventory projects our project team has completed over the years. WK Dickson's project team will meet with AED and other consultants selected to complete watersheds and discuss possible attribute domains and default values to increase quality control measures that can be incorporated into the data collection campaign. It will also be important to standardize condition assessments so that consistent "grading" of condition is achieved between the multiple firms.

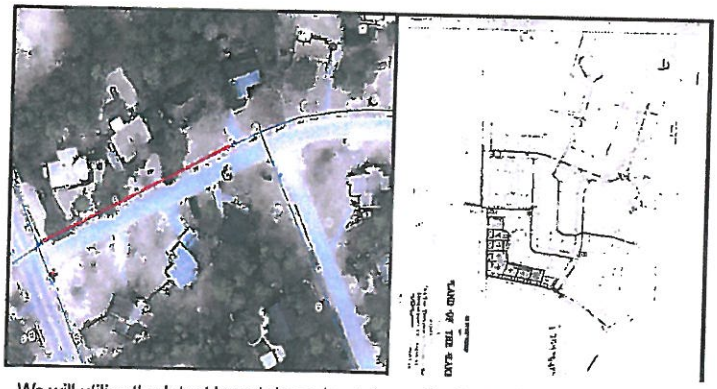
Through working with multiple clients embarking on similar efforts, our project team also brings tremendous experience in small changes to the data model that can have big impacts on the quality and usefulness of the information for future needs. A recent example of a change that we suggested in the collection of outfall structures occurred in the City of Wilmington's stormwater inventory. By adding evidence of illicit discharge to the attribute tables of point structures as well as open channels, we were able to quickly note more than fifty potential illicit drain connections in just one work zone of the downtown AED area. This information is invaluable when looking at sources for contaminants during future Illicit Discharge Detection and Elimination (IDDE) efforts.

RELATED EXPERIENCE AND SUCCESS

Data Collection

Following review of the data model, WK Dickson will commence with the data collection phase including the inventory of the drainage infrastructure. There have been numerous advances in field data collection technology in recent years. Each of these advancements will serve to provide AED with a more efficient inventory campaign while also increasing data accuracy.

WK Dickson will utilize the latest in web-based mobile applications to locate structures and populate attributes for each asset. This approach will utilize a tablet computer that has an integrated GPS receiver. While the GPS receiver is considered a "recreational" grade receiver and does not meet the accuracy standards for final location of assets, the GPS point collected by the tablet will serve as an initial location for establishing connectivity and capturing attributes. Each two-person field crew will also locate the structure with survey-grade GPS or conventional survey equipment to collect a "refined" location that meets the accuracy requirements of the field data collection effort.



We will utilize the latest in web-based mobile applications to locate structures and populate attributes for each asset.

WK Dickson will again utilize our automated connectivity tools with the tablet application. This will allow interpolation of lines between point structures using size, material of incoming and outgoing pipes as well as invert elevations. WK Dickson utilized this same set of connectivity tools in the inventory of the Fort Gordon sanitary sewer collection system in 2009. Not only does this reduce the time needed for digitizing lines in the office, the connectivity tools provide field crews with "real-time" quality control feedback by identifying mismatches in pipe size, material or slopes outside normal ranges. This allows field crews to resolve data entry issues while still in the field and cuts down on return visits to resolve problem areas.

Survey Grade GPS

With the recent advancement of geodetic technology, specifically the Virtual Reference System (VRS), WK Dickson is now proud to offer survey quality GPS data (where signal allows) for the same cost as mapping grade GPS. This offers a tremendous value to AED especially in considering long-term goals for hydraulic and hydrologic modeling.

The VRS for precise geodetic positioning is comprised of a balanced network of GPS Virtual Reference base Stations strategically situated throughout the state. This technology uses GPS hardware, software and communication links that model GPS errors propagated throughout regions. Permanent reference stations,

RELATED EXPERIENCE AND SUCCESS

participating in a regional VRS network, continuously transmit observation data to centralized servers.

This technology enables WK Dickson to provide the AED with Survey Grade horizontal and vertical data with accuracies to 1/10th meters on structures where a viable survey grade signal can be acquired. In areas where survey grade GPS cannot be utilized due to tree canopy or multi-pathing issues, WK Dickson will use conventional survey technologies to maintain consistent survey-grade accuracy or can provide mapping-grade GPS accuracy if AED would prefer.

WK Dickson offers survey quality GPS data for the same cost as mapping grade GPS, greatly improving value of the project in the long-term.

Attribution

In addition to locating and collecting elevations on stormwater features, data will need to be collected for stormwater structures, BMPs, and other open systems to meet multiple objectives including but not limited to modeling, maintenance, and NPDES requirements.

WK Dickson understands that the inventory will need to facilitate maintenance of the infrastructure system. Towards that goal, we will work with the AED during the data model review process to develop quantitative ratings for the condition of drainage structures and a maintenance prioritization process. Our field crews will apply those ratings during field collection and we will deliver a structures inspection report at the end of the phase. The AED will be notified of any structures requiring immediate maintenance within 24 hours of inspection. Notifications will be emailed to AED's project lead as well as be made available on WK Dickson's project web application. Field collection crews experienced in the collection of stormwater drainage features will be utilized for this task as drainage inventories can differ significantly from conventional survey and other utility inventories.

Safety and Traffic Control

Maintaining safety and traffic control in an efficient manner is of extreme importance in any community and certainly to the AED. Safety First Rules are strictly enforced both for the sake of our staff as well as for the sake of the general public. It is standard policy for our crews to comply with the latest versions of the Manual on Uniform Traffic Control Devices (MUTCD). Additionally, we require our crews to wear safety vests and identification badges at all times.

Supporting GIS Data

Existing GIS data will be compiled through various sources including Augusta-Richmond County, Augusta Utilities Department, NCDEM, GDOT, BASINPro, and the Augusta Engineering Department.

RELATED EXPERIENCE AND SUCCESS

Compiled data layers are expected to include aerial photography, topographic data, soils, land use, zoning, planimetrics, parcels, streams and floodplain boundaries.

Utility data and as-built surveys will be reviewed if available. This source data will be referenced during all phases of the project to ensure a thorough understanding of variables influencing the stormwater collection and conveyance systems.

During the data model review process we will develop quantitative ratings for the condition of drainage structures and a maintenance prioritization process.

TASK 2 – DATA INTEGRATION

We understand that the AED currently uses ESRI software products. WK Dickson recognizes ESRI as the industry leader in GIS software and often uses ESRI technical advisors to assist with recommending project specific software components. Our team currently uses the ArcGIS 10.1 suite of software products including ArcInfo, ArcEditor and ArcView. For web-based applications we utilize ArcGIS for server version 10.1.

The Geodatabase

WK Dickson typically prefers to conduct all phases of work within the geodatabase. The geodatabase model offers many quality control advantages associated with advanced GIS applications which were previously unavailable without writing custom scripts. For example, feature subtypes and attribute domains will be defined for attribute values to ensure proper classification and tabular precision. Likewise, establishing topology and relationship classes makes features within the dataset smarter by allowing user-defined "business rules" which ensure data integrity and correct functionality between spatial layers. Additionally, the geodatabase can be read and edited using Microsoft Access and can be designed specifically for ease of data maintenance with work order management applications.

Integrating GPS Data to the Geodatabase

Upon completing the inventory of each work zone, the daily GPS field files are merged into one "master" file. The work zone, as a whole, is then loaded into the geodatabase. Features and attributes are automatically correlated to their prospective feature classes within the geodatabase feature dataset using the structure's unique identification number. This process allows rapid data collection in the field of both attributes and survey locations, while also allowing automation of quality control processes for both attributes and positional accuracies of structures.

RELATED EXPERIENCE AND SUCCESS

Generating System Connectivity

One of the most critical aspects of a stormwater inventory is the overall system connectivity. Over the past ten years, WK Dickson has developed rigorous protocols to ensure system connectivity which culminated in our development of the Attribute Verification Module (AVM). This module has been solely developed to analyze the hundreds of combinations of data collected on each node and pipe and to look for items out of tolerance and flag them for the technician. It allows us to provide a complete quality control of the stormwater inventory not just a statistical sample of a portion of that inventory. When our team delivers the final system map in GIS, the system connectivity is complete and the attributes are accurate.

Scanning and Hyper-Linking

Scanning and hyper-linking the structure inspection report of inventoried features is a valuable measure that assists with the overall quality control effort. WK Dickson understands the value of having these reports readily available should a question arise. These documents, combined with digital photos, help to "paint a picture" of each feature contributing to the stormwater system. Hyper-linking digital files to the database will provide immediate access to information that could potentially take hours to recover.

Data Maintenance

The stormwater infrastructure data collected represents a static point in time. Moving into the future, the AED will need to maintain the data. WK Dickson will work with the AED to develop procedures for maintaining the database including incorporating information from electronic record drawings and collecting additional field data as needed. WK Dickson will train AED Staff in all maintenance related procedures as well as document the procedures in a Stormwater Data Maintenance Manual.

WK Dickson has vast experience with a variety of modeling packages and will work with AED staff during the development of the project scope.

TASK 3 – ASSESSING FLOODPLAINS

We understand the need to accurately model the stormwater management system and offer technically sound, cost-effective alternatives. We also understand that models represent watershed conditions at a discrete point in time and therefore must be usable to AED staff well after this project is completed. WK Dickson staff has vast experience with a variety of modeling packages and will work with AED staff during the development of the project scope to determine the best model, or combination of models, using a model selection matrix, to meet the goals of the project. At a minimum, model selection is based on the goals of the study, the type of drainage features modeled, physical constraints, license requirements, and data accessibility.

RELATED EXPERIENCE AND SUCCESS

While we feel a collaborative decision with input from AED staff is critical for model selection, we strongly recommend that the AED consider using EPA SWMM as the primary model for the watershed management plans. In our experience SWMM is the model best suited to evaluating drainage systems with both open and closed features particularly those systems with flat or negative slopes. Additional benefits of SWMM include the following:

- Combined hydrology and hydraulic routines account for the routing effects of open channels and overbank storage areas without iterating between models.
- Changes in peak flows resulting from proposed modifications to channels or pipes are calculated in one step, so that upstream and downstream impacts of proposed improvements can be immediately evaluated.
- Water quality based on buildup and wash-off parameters can be modeled within the same framework.
- Model is well known within the industry and non-proprietary.

WK Dickson has also utilized GIS-based tools to interface with SWMM to increase the efficiency of populating the model with input and visually displaying output. These routines can import inventory data from a geodatabase format directly into the model, drastically reducing the time required for data input.

For FEMA mapped streams, AED may want to consider utilizing HEC-RAS to maintain consistency with the Georgia Floodplain Mapping Program. At a minimum the effective FEMA models will be used as a validation tool and data resource for the SWMM model.

As noted above, SWMM can be used to model water quality using loading rates. Water quality modeling is typically limited by a lack of monitoring data from a quantitative prospective, although the models can provide a qualitative benefit even without monitoring data. We will utilize any monitoring data available and make recommendations for additional sampling which can be incorporated into the model in the future. Furthermore, these recommendations can be implemented system-wide so that additional monitoring data will be available for future watershed plans.

TASK 4 – REFINE WATERSHEDS

Watersheds and sub watershed boundaries that are developed prior to the inventory and analysis tasks are based on a variety of datasets including hydrologic and topographic data of varying precision. Naturally, as the inventory and subsequent analysis of each watershed and sub watershed is completed, anomalies in the original boundaries can be expected.

Based on methodologies described in Federal Standards and Procedures for the National Watershed Boundary Dataset: Book 11, Collection and Delineation of Spatial Data (2012), and characteristics observed during the preliminary data evaluation, WK Dickson will define the boundaries of sub-watersheds using available topographic and hydrologic data. Administrative and/or political boundaries will not be used to delineate subwatersheds, unless they are coincident with appropriate topographic and hydrologic features.

RELATED EXPERIENCE AND SUCCESS

Within the subwatersheds, each tributary's stream orders will be classified using remote sensing techniques. Summary tables will be prepared for each sub-basin to include drainage area and lengths by order.

TASK 5 – DEVELOP CONCEPTUAL TRAILS

AED has requested as part of the Asset Collection Services that firms also develop conceptual trails for walking, biking and jogging. While not always coincident with stormwater inventory projects, recreational facilities including trails are often an excellent use of areas defined as unsuitable for structural development. As part of the Urban Development discipline, WK Dickson specializes in low-impact and sustainable design projects for parks and recreation facilities. We will work with AED to clearly define the needs of developing these trails within the watersheds to make sure the appropriate resources are dedicated to this need. WK Dickson's Urban Development practice is comprised of Registered Landscape Architects, AICP Certified Planners and design staff that are experienced in developing such facilities and can help AED clearly identify and scope these needs.

Phase Two: Water Quality Characterization Services:

The characterization of water quality through physical, chemical, and biological monitoring is an integral component of the evaluation, design, and implementation of basin-wide stormwater assessment programs. WK Dickson will be working with Nutter & Associates to bring a wealth of experience conducting water quality and biological sampling, including applicable state-sponsored training and/or certifications in Georgia, South Carolina, and Florida.

Nutter & Associates has developed and implemented monitoring programs for analytical water quality (nitrogen and phosphorus nutrient species, metals, color, suspended solids, fecal coliform, and E.coli), in situ water quality (temperature, dissolved oxygen, pH, turbidity, and conductivity), stream hydrology (continuous stream gauging, velocity-area discharge measurement, and stage-discharge rating curve development), stream channel characterization (morphometric survey, stability assessment, and aquatic habitat inventory), and biological assessments (benthic macroinvertebrates, fish, and vegetation surveys) for over 45 different projects totalling more than 150 streams since 1984.

Our team will bring a wealth of experience conducting water quality and biological sampling, including applicable state-sponsored training and/or certifications.

These projects have included water quality and biological monitoring pursuant to NPDES permit requirements and in accordance with Georgia Environmental Protection Division (GA EPD) protocols for

RELATED EXPERIENCE AND SUCCESS

seventeen municipalities in Georgia, as well as for industry, private businesses, federal and state agencies, and non-profit watershed groups in Georgia, South Carolina, North Carolina, Tennessee, Florida, Alabama, and Texas.

TASK 6 – ASSEMBLE HISTORICAL MONITORING DATA

To begin, the team will obtain and analyze the existing forcing data relevant to the water quality and quantity modeling effort. The Time Series Data Analyst, a tool developed at the Utah Water Research Laboratory at Utah State University, will be used and provided to AED staff and other interested stakeholders via a web server or a local installation. The Time Series Data Analyst allows users to view and analyze available surface water quality data, climate data, streamflow data and water temperature data for each station. The database of water quality, climate, streamflow and water temperature data are linked to a geographic coverage showing the locations at which the data have been collected and therefore, provides a spatial and temporal understanding of the data. Analysis capabilities include a variety of data plotting options including time series plots, probability plots, histograms, box/whisker plots, correlations, and data gap plots. The statistical analyses available include censored data analysis, geometric and arithmetic mean, standard deviation, coefficient of variation, and quantiles.

The time series data of interest for modeling (including flow, water quality, weather data, and point source loading information) will be analyzed to assess whether there is adequate resolution for model population and calibration.

TASK 7 – EVALUATE RECEIVING WATERS FOR CHANNEL STABILITY

Channel stability surveys are utilized to evaluate stream health and potential impacts to biological communities associated with increases in watershed impervious surfaces and subsequent changes in the hydrologic regime of receiving channels. Stability assessments are often employed as part of a comprehensive data collection effort to evaluate localized and watershed-scale factors affecting water quality and biological communities.

Stability assessments are often employed as part of a comprehensive data collection effort.

A combination of quantitative (survey, pebble counts) and qualitative (streamwalk, rapid assessments) assessment methods are often desired to provide a more robust dataset for comparative analysis and prioritization of stormwater infrastructure improvement projects.

TASK 8 – ANALYZE WATER QUALITY THROUGH CHEMICAL AND BIOLOGICAL METHODS

To comprehensively assess water quality and the influence of stormwater runoff, both dry-weather and

RELATED EXPERIENCE AND SUCCESS

wet-weather monitoring should be conducted according to GA EPD guidance. Dry-weather water quality is typically employed to evaluate baseflow conditions, while wet-weather monitoring is targeted to assess both the quality and quantity of stormwater runoff and any deviations from baseflow conditions. In accordance with GA EPD criteria, wet-weather water quality samples should be collected as a composite of a series of subsamples collected over the complete hydrograph of a storm event with total precipitation of at least 0.5 inches. Collection of subsamples that will form the composite should begin during the early rising limb portion of the hydrograph and will continue for a minimum of three samples into the decreasing or falling limb portion of the hydrograph.

In contrast to water quality monitoring where samples are collected at discrete points in time, biological monitoring is a useful tool to evaluate longer-term stream health as the aquatic community is chronically exposed to any water quality and/or physical stream impairments. Our diverse team of experienced professionals includes biologists and hydrologists who have conducted biological and physical stream assessments in 48 watersheds within the Southeastern U.S.

TASK 9 – ASSIST IN DEVELOPING AN AUTOMATED RAIN GUAGING NETWORK

Establishing an automated rain gauging network requires selection of appropriate sites in existing easements or through collaboration with landowners that will minimize risks of damage while also providing suitable rainfall data. Our Team will work with AED to identify suitable rain gauging locations as well as installation and calibration of telemetry-enabled samplers.

TASK 10 – ASSIST IN DEVELOPING AN AUTOMATED WATER QUALITY MONITORING NETWORK

Automated water quality monitoring is a useful tool for assessing long-term water quality conditions while minimizing resource and financial burdens. Our Team has implemented numerous projects where automated water quality and/or hydrological monitoring were conducted. These projects include the installation, maintenance, and calibration of ISCO® samplers, single- and multi-parameter (temperature, pH, conductivity, and dissolved oxygen) water quality meters, and water level loggers for NPDES permit requirement monitoring, GA EPD Watershed Assessments, flow-weighted sampling, and water quality evaluations.

The Project Team will work closely with AED to establish suitable locations for water quality and/or biological monitoring. As a part of monitoring station identification, drainage basin area, point- and non-point discharge locations, accessibility, laboratory analysis cost, and watershed-specific objectives will be considered.

TASK 11 – EVALUATE BMP'S IN STRATEGIC AREAS

Potential BMP retrofit sites will be identified using various layers in GIS including the following: aerial photography, parcels, land use, storm water inventory and hydrologic network, and topography
The proposed locations for the BMPs will be evaluated based on the following criteria:

RELATED EXPERIENCE AND SUCCESS

- Watershed Size / Drainage Area – Larger watershed sizes allow an opportunity for more treatment. A significant contributing drainage area would allow the use of a larger, more regional BMP such as a wet pond or extended detention wetland.
- Percentage of impervious area – Areas with high impervious percentages allow an opportunity for more treatment.
- Agricultural land use – Agricultural areas can be significant contributors of sediment and nutrients.
- Proximity to existing conveyance system – Runoff will need to be diverted into the BMP and then discharged back to the conveyance system. Locations in close proximity to the existing conveyance system will reduce the cost associated with constructing new drainage structures.

Potential BMP retrofit sites will be identified using various layers in GIS.

- Land Availability/Ownership – The proposed BMPs will require undeveloped land. Publicly owned land will be strongly considered for potential BMP sites as well as parcels with stream and wetland projects already identified.
- Topography – Sufficient vertical relief, up to 5 feet, is required to allow certain BMPs (i.e., bioretention and wet ponds) to function per design requirements.
- Hydrologic conditions – BMPs such as wet ponds or extended detention wetlands need the proper hydrologic conditions for plants to survive. The soils or existing water table must allow for the BMP facility to permanently hold stormwater runoff.

TASK 12 – EVALUATE METHODS TO MAINTAINING CONNECTED BUFFER SYSTEMS

Stream and buffer preservation may be applicable to prevent stressors from impacting the functionality of the riparian system. Potential preservation sites will be identified based on the following criteria:

- Minimum length of 5,000 linear feet;
- Less than three landowners per 5,000 linear feet;
- Riparian buffer present;
- Proximity to headwaters;
- Proximity to existing conservation areas; and
- Proximity to 303(d) listed streams or areas of known water quality/benthic impairment.

TASK 13 – EVALUATE METHODS TO REDUCE FLOOD DAMAGE

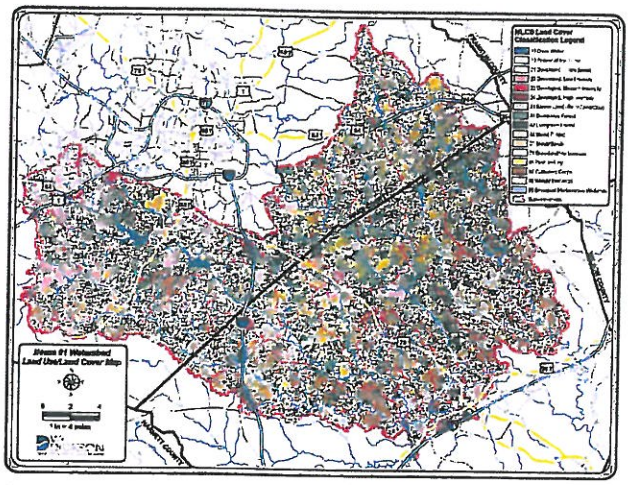
Our Project Team has designed, installed, and maintained hydrometric monitoring networks to assess stream and wetland hydrologic dynamics, determine the degree and frequency of stream overbank flooding,

RELATED EXPERIENCE AND SUCCESS

and evaluate the restoration success of streams and wetlands. We will utilize this experience gained throughout the southeast including current and historic projects within the Phinizy Swamp and Spirit Creek watersheds local to Augusta to evaluate methods for reducing flood damage from current levels.

TASK 14 – EVALUATE METHODS TO REDUCE POLLUTANTS

Following data collection and evaluation, watersheds will be classified as functioning, functioning-threatened, degraded, or non-functioning for pollutants as well as aquatic habitat. Utilizing monitoring data from outfall inspections and the water quality monitoring network combined with GIS data such as land use classifications; suspected sources for pollutants will be identified. Additionally, methods for enhancements to BMPs, stream stability and wetland functions will be evaluated to reduce pollutants from current levels.



Monitoring data from various sources combined with land use classifications will help identify suspected sources for pollutants.

TASK 15 – EVALUATE METHODS TO ENHANCE AQUATIC DIVERSITY

Similar to reducing pollutants, impediments to aquatic diversity will be identified through sampling and water quality monitoring results. Various methods including stream restoration, connection of multiple stream reaches, localized BMPs regenerative stormwater conveyances, biofiltration conveyances as well as removal of fish/aquatic species obstructions are all methods our Team has routinely utilized to enhance aquatic populations and diversity.

TASK 16 – EVALUATE METHODS TO ENHANCE CHANNEL INTEGRITY

Our Project Team will utilize several methods for assessing channel stability at specific locations including:

- Rapid assessments such as GA EPD habitat assessment protocols, the Bank Erosion Hazard Index (BEHI) method, and the Rapid Assessment of Channel Stability as described in Hydraulic Engineering Circular (HEC)-20,
- Channel substrate analyses including Wolman pebble counts and sieve-based particle size distribution analysis,
- Morphometric survey techniques including cross-section surveys in concert with hydraulic capacity analyses utilizing regional regression equations to evaluate the degree of channel incision and widening, and,
- Stream-walk GPS inventories of localized aggradation, degradation, and bank failure.

RELATED EXPERIENCE AND SUCCESS

TASK 17 – EVALUATE METHODS TO ENHANCE AND MAINTAIN WETLANDS

Wetland scientists from WK Dickson and Nutter & Associates will collaboratively review aerial photos and topographic data along with soils mapping and NWI wetlands mapping to identify potential wetland sites. The scientists will identify wetland restoration/enhancement sites for assessment based on having a topographically lower landscape position, soils with hydric inclusions, absence of or minimal forest cover, and the appearance of one or more drainage alterations such as ditching. Sites having more than three landowners will be excluded because of the difficulty in working with multiple landowners to develop a viable project. When identifying potential preservation sites, sites will be identified that appear to be well-vegetated, functioning wetlands.

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

WK Dickson understands the importance to AED of accurate and complete data on this project. It should be emphasized that the team proposed has developed a QA/QC process second to none in the industry. It is composed of a systematic series of checks and balances integrated into each step of the project from day one and not just something performed after the fact. Quality Control begins with establishing a program at the start of the project and following that program throughout. Examples of QA/QC procedures in our program include the following:

- Inspection of GPS point quality at the time of observation
- Separate checks and balances within field attribute data dictionary
- Comprehensive verification of system connectivity & attributes using GIS connectivity tool and visual QC
- LiDAR data for verification of vertical elevations
- Independent verification of subset of inventory data
- Redline review
- Customized modeling and planning checklists
- Model validation with high water marks and known flooding areas
- Peak flow comparison with various hydrologic methodologies

WK Dickson would welcome the opportunity to demonstrate any or all the items we use for QA/QC. Further, we encourage you to contact our clients and ask them about the quality of our data. In addition to assuring the quality of deliverables, our QA/QC program includes procedures for meeting schedules and budgets. WK Dickson has a proven track record of meeting aggressive schedules and is ready to put that record to work for the AED on your project. Our Project Managers have a 100% staff commitment from the principals of our firm when they commit to a schedule such as that proposed for your project.

WK Dickson has the right team available to complete your project within your schedule specified in the RFQ. Once resources are committed, WK Dickson provides the "tools" necessary to ensure success including an in-house accounting system, Microsoft Project, virtual private network, WebEx software, FTP site, and a GIS-based project website with layered access security that will allow information to be disseminated to the public as well as secure exchange of data and drawings for the project team and the AED.

PROJECT EXPERIENCE

WATERSHED PLANNING AND STORMWATER SYSTEM INVENTORY — GAINESVILLE, GA

WK Dickson performed the inventory of over 18,000 stormwater structures throughout the City of Gainesville. The services were translated into 4 distinct task teams: Inventory & Map Compilation; CIP Prioritization & Implementation; Watershed Planning; and O&M Programming. Our project team provided an approach that balanced all of the complex elements required for a successful outcome - merging project specific goals and challenges, community impact considerations, and regulatory compliance. The overall goal was to identify and prioritize repair and replacement needs and to provide a basis for planning future growth to avoid increased flooding throughout the Gainesville jurisdictional community. The process culminated in a 5-year plan for implementation of a program to repair/replace infrastructure that includes cost estimates, schedule and recommendations for future funding priorities.

Project Highlights:

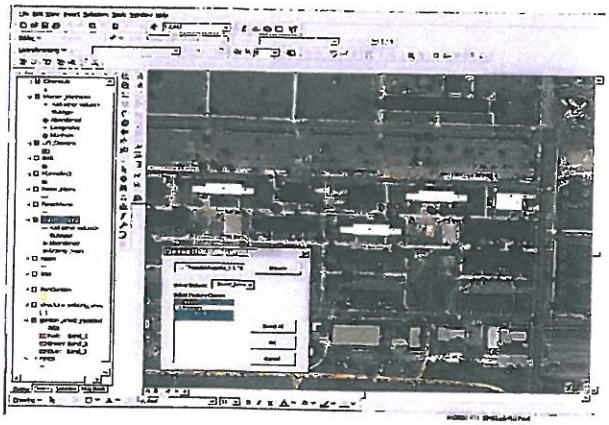
- Assets Collected – 18,000
- Project Team Size – 10 members
- Project Duration – 7 months
- Watersheds Evaluated – 4
- Average Basin Size – 700 acres

FORT GORDON UTILITY INVENTORY — AUGUSTA, GA

WK Dickson provided complete GIS-based inventory of the Fort Gordon Base water and sewer infrastructure that was recently added to the Augusta Utility Department system. GIS inventory included existing water and sewer utility features to provide knowledge for maintenance and management of the utility resources. The project also included a field inventory, location for approximately 1,300 sewer manholes, 50 pump stations and 600 cleanouts as well as GIS database development. Features were entered into a certified ESRI geodatabase. Pipe connectivity between sewer manholes and attribute information was performed on each pipe inspection. During the project the WK Dickson team coordinated exclusively with Augusta Utilities Department to collect data for difficult access structures and to achieve project deadlines and budget constraints.

Project Highlights:

- Assets Collected – 1,950
- Project Team Size – 4 members
- Project Duration – 2.5 months
- Basins Evaluated – 1 complete drainage area
- Average Basin Size – 8,500 acres



PROJECT EXPERIENCE

MUNICIPAL CONSULTING SERVICES— OAKWOOD, GA

WK Dickson coordinated and provided program management for the inventory of approximately 5,000 stormwater structures throughout the City of Oakwood. The overall goal was to identify and prioritize repair and replacement needs and to provide a basis for planning future growth to avoid increased flooding problems throughout the Oakwood jurisdictional community. The process culminated with a 5-year plan for implementation of a program to repair/replace infrastructure that includes cost estimates, schedule and recommendations for future funding priorities.

Project Highlights:

- Assets Collected – 5,000
- Project Team Size – 7 members
- Project Duration – 6 months
- Watersheds Evaluated – 3
- Average Basin Size – 500 acres

STORMWATER INFRASTRUCTURE MAPPING — WILMINGTON, NC

WK Dickson provided on-call services for the GIS/GPS mapping of stormwater infrastructure as outlined in individual task orders for public system pipes 12 inches in diameter and greater. This project included establishing inventory protocols that met multiple project goals. These goals included:

- Leveraging existing stormwater data
- Improving future decision-support for system maintenance
- Establishing the data framework for NPDES Phase II outfall monitoring, analysis and design, Identification of areas in need of rehabilitation

Services included mapping and attribute collection of stormwater features using Real-Time Differential (RTD) techniques to yield sub-meter horizontal locations. Data was collected in ESRI personal Geodatabase format using NC State Plane coordinate system NAD83 datum. Quality assurance/quality control (QA/QC) procedures were implemented to verify spatial and attribute data accuracy.

Project Highlights:

- Assets Collected – 13,000
- Project Team Size – 9
- Project Duration – 8 months
- Watersheds Evaluated – 4
- Average Basin Size – 1,000 acres

WATERSHED INVENTORY AND MASTER PLAN — GREENVILLE, NC

The City of Greenville hired WK Dickson to assist them with city-wide storm water master planning and inventory. Due to our extensive master planning experience in North Carolina, they chose WK Dickson to be the lead firm to represent the City in developing their standard operating procedures (SOP) for inventory, master planning, and maintenance. In addition to developing the

PROJECT EXPERIENCE

standard operating procedures, we are applying these SOPs to the Meeting House Branch and Bells Branch Watersheds. These large watersheds were selected because they contained all of the various elements the City anticipates encountering as we move the master planning project city-wide. Some examples include integration of FEMA data, open system modeling, closed system modeling, dams and BMPs, as well as a wide variety of urban and rural land uses. The City desires to develop a city-wide CIP based on WK Dickson's work in identifying needed drainage infrastructure improvements, developing a watershed ranking protocol, prioritizing improvements with a quantifiable prioritization matrix, and programming the projects over a 10-20 year timeframe.

The watershed inventory included analysis of available models for water quality, hydrologic and hydraulic modeling and preparation of matrix examining metrics for consideration in model selection; review of existing data sources to include GIS, FEMA flood studies, and USGS studies; gaps analysis, crest gauge installation to collect high water data; as well as stream walk and photolog of primary system to gather data for the modeling analysis and geomorphic stream assessment. The stormwater inventory includes mapping and attributing of closed system for pipes greater than or equal to 15" in diameter and 50' in length. As part of inventory, the City was notified of any suspected illicit discharges within 24 hours. Identifiable BMPs such as dry pond, wet pond stormwater wetland or bioretention areas were included in the inventory as well as detention/retention facilities if required for hydraulic model. ESRI ArcGIS software was used to compile GIS representation of underground stormwater system to establish system connectivity.

A Watershed Masterplan was prepared that identified problem areas and detailed improvement options that will meet City design standards and that utilize best management practices for water quantity and quality control. The Plan evaluated capital construction costs and prioritized projects based on public safety, level of service, flood reduction benefits, water quality improvements, capital costs, private property impacts, permitting requirements, and available funding.

Project Highlights:

- Assets Collected – 2,100
- Project Team Size – 9
- Project Duration – 19 months
- Watersheds Evaluated – 5
- Average Basin Size – 375 acres

4TH, 5TH, AND 6TH STREET INFLOW/ INFILTRATION REMOVAL PROGRAM — AUGUSTA, GA

Augusta's downtown sewer collection system had significant obvious connections to drainage in the area, creating escalating concerns about surface water contamination. Our team performed an SSES evaluation of this critical area in downtown

PROJECT EXPERIENCE

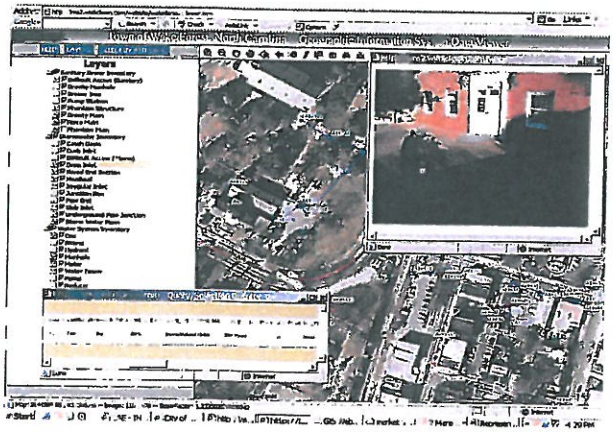
Augusta. The evaluation included CCTV, manhole inspections, flow isolation, temporary flow monitoring and repair prioritization. The findings of the evaluation ranged from the need to address abandon cleanouts that were a direct source of inflow to the system, to impending collapse of the 120 year old brick arch sewer near the existing railroad. This study also allowed the Utility to prioritize improvements through the utilization of in-house staff to external projects - such as portions of the brick arch replacement.

STORMWATER INVENTORY — WAKE FOREST, NC

The Town of Wake Forest is a Phase II, 2000 designee census community assigned by the Environmental Protection Agency for inclusion in the Phase II stormwater program because its municipal boundary intersects a US Census-defined Urbanized Area. To help meet this requirement, a multi-phase, multi-year survey grade GPS mapping project of the Town of Wake Forest's stormwater drainage system was implemented. This project includes the attribution of the closed stormwater conveyance system with associated bridge and culvert surveys on FEMA blue line streams. The GIS stormwater program was designed to instantly provide Town management up-to-date and complete information regarding the condition of the stormwater system as well as the size and length of storm sewer mains throughout the system. This project also assists the Town with the overall maintenance and rehabilitation of the system as problems are identified. All project data are developed using the ESRI ArcGIS Geodatabase model and updates to the Town are delivered through our innovative internet mapping management system which allows for real time updates and management of the newly acquired storm water system without the use of expensive GIS software.

Project Highlights:

- Assets Collected – 9,000
- Project Team Size – 7
- Project Duration – ongoing
- Watersheds Evaluated – 13
- Average Basin Size – 450 acres



STORMWATER MASTER PLAN — NAGS HEAD, NC

As part of a comprehensive update to the Town's existing Stormwater Management Plan, WK Dickson performed an island-wide GIS/GPS stormwater inventory, modeled the existing conditions of the stormwater drainage system, and proposed recommended improvements to

PROJECT EXPERIENCE

mitigate flooding and improve water quality. Twenty-six capital projects were recommended with estimated construction costs totaling approximately $6,300,000. Project components included vegetative conveyance and water quality BMPs to provide runoff treatment prior to discharging to the surrounding water bodies.

Capital project locations were identified based on input from Town staff, feedback from residents through public meetings and mailed questionnaires, and hydrologic and hydraulic modeling results. The modeling was performed by integrating the GIS data into EPA SWMM. This model was selected because it is a dynamic rainfall-runoff simulation model that allows both single event and long-term (continuous) simulation of runoff quantity and quality from urbanized areas. It is particularly useful in modeling complicated drainage systems that are found in coastal environments.

The capital projects were prioritized based on factors including public safety, cost, and permitting requirements to assist the Town in allocating funding from its newly established stormwater utility. WK Dickson also reviewed and made recommendations to update the Town's existing stormwater management policies and ordinances in order to comply with local, state and federal stormwater guidelines, including any requirements of the NPDES Phase II regulations should the Town be selected by the State of North Carolina for inclusion into the Phase II program.

Project Highlights:

- Assets Collected – 6,300
- Project Team Size – 6
- Project Duration – 14 months
- Watersheds Evaluated – 2
- Average Basin Size – 1,200 acres

STORMWATER MASTER PLAN — CASWELL BEACH, NC

The Town of Caswell Beach hired WK Dickson to perform a stormwater master plan and inventory of the existing drainage system. The primary purpose of the planning effort is to identify flooding issues and potential structural and non-structural means of mitigating it. In addition, retrofit opportunities for water quality Best Management Practices (BMPs) were recommended to assist the Town with their water quality goals. The Town was experiencing flooding in several areas of the community due to an undersized drainage system or, in some cases, no drainage system at all. As with flooding in any coastal community, the challenge was finding an alternative that reduced flooding without jeopardizing water quality. It was imperative that any alternative considered be viewed as "permittable" in the eyes of the local regulatory agencies.

WK Dickson modeled the Town's drainage systems using EPA SWMM Version 5.0 due to the complexities of tidally influenced open drainage systems, influence of numerous ponds on downstream peak flows, and SWMM's ability to combine hydrology and hydraulics as well as model pumps. The proposed alternatives consisted of a new golf course pond, a series of stormwater pump stations throughout the Town, and upsizing a series of culverts to prevent or reduce structural flooding. All told, five pump stations were proposed along Caswell Beach Road that used the available infiltration capacity between the primary and secondary dunes to receive excess floodwaters that ponded along the roads.

PROJECT EXPERIENCE

The project was successful because WK Dickson effectively brought in numerous regulatory parties or private stakeholders early in the process and created a sense of "buy-in" from the different groups. Teamwork with the local utility company and private golf course was essential to having a successful project.

Project Highlights:
- Assets Collected – 8,500
- Project Team Size – 6
- Project Duration – 9 months
- Watersheds Evaluated – 6
- Average Basin Size – 900 acres

STORMWATER MASTER PLAN — ATLANTIC BEACH, NC

As part of the Town's Stormwater Master Plan, WK Dickson performed an island-wide GIS/GPS stormwater inventory and proposed recommended improvements to mitigate flooding and improve water quality. Eleven projects were recommended with estimated construction costs totaling approximately $5,800,000. Project components included vegetative conveyance and water quality BMPs to provide runoff treatment. Capital project locations were identified based on input from Town staff, feedback from residents through public meetings and mailed questionnaires, and hydrologic and hydraulic modeling results. The modeling was performed by integrating the GIS data into EPA SWMM.

As part of the Master Plan, WK Dickson evaluated single event water quality samples and made recommendations to the installation of water quality sampling stations island wide. The results of the water quality study will be used to identify sources of bacterial contamination and prioritize water quality capital projects. Grant funding from the Clean Water Management Trust fund was pursued to enhance this portion of the project.

Ultimately the Town desires sustainable solutions to improve water quality on the Island, provide relief from stormwater flooding, and improve the overall quality of life for the island residents. WK Dickson also reviewed and made recommendations to update the Town's existing stormwater management policies and ordinances in order to comply with local, state and federal stormwater guidelines. Although the Town is not a Phase II community currently, the stormwater master planning efforts were completed in a manner that is consistent with Phase II requirements including all six minimum measures.

Project Highlights:
- Assets Collected – 4,700
- Project Team Size – 9
- Project Duration – 15 months
- Watersheds Evaluated – 4
- Average Basin Size – 1,000 acres

PROJECT EXPERIENCE

BUCKHEAD CREEK WATERSHED STUDY AND DESIGN IMPROVEMENTS — FAYETTEVILLE, NC

WK Dickson completed a watershed master plan for Buckhead Creek in southwest Fayetteville. Buckhead Creek is a FEMA-mapped urban stream with a watershed approximately 5-square-mile at the Fayetteville municipal boundary. Services included an inventory of stormwater conveyance features, public education and involvement, a detailed hydrologic and hydraulic analysis of Buckhead Creek and associated drainage systems, development of flood mitigation alternatives, identification of water quality retrofits, and preparation of a watershed plan report. The stormwater inventory was collected into a geodatabase format and integrated into the City's existing GIS. The hydraulic analysis included evaluating approximately 5.3 miles of Buckhead Creek for multiple storm events using HEC-RAS and evaluating approximately 7 miles of closed piped systems using SWMM or a hydraulic grade line model. Flood mitigation alternatives included increasing the size of the drainage infrastructure, floodplain benches, floodwalls, and wetland restoration. Development of the flood mitigation alternatives was impacted by jurisdictional wetland boundaries, storage behind high roadway embankments, utility conflicts, and limited space due to development. Water quality retrofit opportunities were identified using GIS data and windshield surveys focused on publicly owned properties with significant impervious areas. Recommended projects were prioritized in a capital improvement plan based on factors including public safety, downstream impacts, permitting requirements, frequency of flooding, severity of flooding, and easement requirements. During the second phase of the project, WK Dickson provided construction documents for selected alternatives, represented the City during public hearings and assisted with necessary permitting including ACOE 404 Permit, NCDWQ 401 Certification, and Wetland Delineation Report.

Project Highlights:

- Assets Collected – 3,150
- Project Team Size – 5
- Project Duration – 7 months
- Watersheds Evaluated – 1
- Average Basin Size – 2,500 acres

WATERSHED ASSESSMENT AND PROTECTION PLANS — GEORGIA

Nutter & Associates has extensive experience within the State of Georgia implementing Watershed Assessment and Protection Plan requirements established by the Georgia Environmental Protection Division (GEPD). The GEPD Watershed Assessment program is linked with publically operated NPDES permitted facilities and requires the monitoring and assessment of water quality, biological communities, geomorphology, hydrology, and land use and landcover patterns to evaluate the effects of non-point source pollutants on water resources. To date, Nutter & Associates has completed or is currently working on seventeen individual Watershed Assessment and/or Protection Plan projects across several Ecoregions, including the Piedmont, Southeastern Plains, and Southern Coastal Plain Level III Ecoregions.

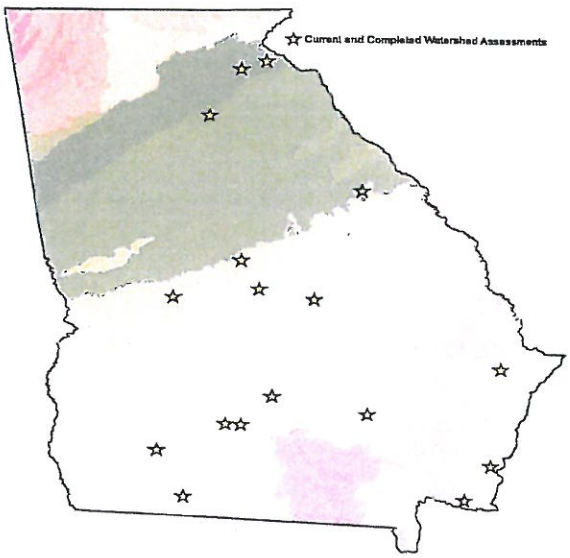
Specific water resource monitoring requirements, all of which have been conducted by Nutter & Associates staff, are detailed below.

- Dry and wet weather water quality monitoring, including physiochemical parameters, nutrients, and metals
- Biological monitoring, including benthic

PROJECT EXPERIENCE

macroinvertebrates and fish
- Bacteriological monitoring, including fecal coliform, E. coli, and enterococci
- Hydrologic monitoring, including stream stage and discharge measurements
- Physical habitat assessments

Following the collection of all field data, Geographic Information Systems (GIS) analyses are used to correlate watershed characteristics, including land use and landcover, drainage basin area, soil types, and weighted runoff coefficients with water quality and biological community metrics. These correlations are then used to recommend and implement Best Management Practices (BMPs), as a part of the Protection Plan, to help protect water resources and/or correct water quality problem areas.



BIOLOGICAL & WATER QUALITY MONITORING WATERSHED ASSESSMENT & PROTECTION PLAN — CITY OF THOMSON, MCDUFFIE COUNTY, GA

Nutter & Associates was contracted to conduct water quality and biological monitoring pursuant to the Watershed Assessment for the City of Thomson. All water quality sampling methodologies adhered to U.S. Environmental Protection Agency and Georgia Environmental Protection Division standard methods and standard operating procedures. Additionally, all biological sampling and identification was carried out by the staff of Nutter & Associates.

To accurately assess stream water quality and geomorphology, an acoustic doppler flow meter and automated water level logging devices were utilized during wet and dry weather monitoring to establish stream rating curves. Additionally, accurate nutrient and metal mass loading rates were calculated based upon stream discharge. During the Watershed Assessment, several point sources of sedimentation and erosion were documented. These observations were essential in the development of the Watershed Protection Plan and overall water quality protection within the region.

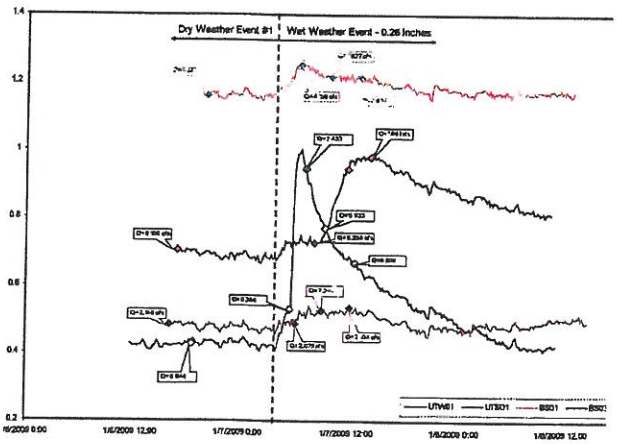
Nutter & Associates continues to work with the City conducting biological and habitat assessment as a part of long-term monitoring requirements.

Project Highlights:
- Conducted biological and habitat assessments between 2007 and 2013 as a part of long-term monitoring requirements
- Responsible for annual status report development and submittal to the GA EPD
- Identified point source pollution sources during watershed monitoring

PROJECT EXPERIENCE

WATERSHED ASSESSMENT & PROTECTION PLAN — CITY OF CAMILLA, MITCHELL COUNTY, GA

Nutter & Associates worked closely with the City of Camilla and Carter & Sloope, Inc., to conduct a Watershed Assessment (WA) and implement a Watershed Protection Plan (WPP) as required by the Georgia Environmental Protection Division (GA EPD). Five water quality monitoring stations were assessed to determine the effects of non-point source pollutants on water quality and biological communities. Based upon the results of water quality monitoring obtained during the WA, a series of watershed management activities were proposed to develop a Watershed Protection Plan.



As a part of the WPP, a Stormwater Utility was adopted by the City to control stormwater run-off and subsequent localized flooding. The Stormwater Utility established stormwater user fees and a stormwater management implementation schedule for addressing the needs of the community. Additionally and due to the predominant agricultural land use within and surrounding the City, a regional water resource collaboration was initiated between regional stakeholders. The goal of the regional water resource collaboration was to establish coordinated efforts to control stormwater run-off, non-point source pollution, and aquatic habitat enhancement for the regional water resources.

Project Highlights:

- Assisted in the development of a Stormwater Utility and Management Plan
- Participated in stake holder meetings to address stormwater & pollution within watershed
- Continue to assist the City in conducting biological monitoring as a part of long-term monitoring requirements.

REFERENCES

Robert Luse
Mapping Coordinator
City of Gainesville, GA
770.535.6882
Project: Watershed Planning and Stormwater System Inventory

Wes Byne, PE
Engineering Manager,
City of Augusta, GA
706.821.1706
Project: Fort Gordon Utility Inventory

Stan Brown
City Manager,
City of Oakwood, GA
770.534.2365
Project: Municipal Consulting Services for Oakwood

Scott Godefroy, PE
City Engineer
City of Greenville, NC
252.329.4525
Project: Greenville Watershed Inventory and Master Plan

Eric Keravuori, PE
Town Engineer
Town of Wake Forest, NC
919.435.9441
Project: Wake Forest Stormwater Inventory

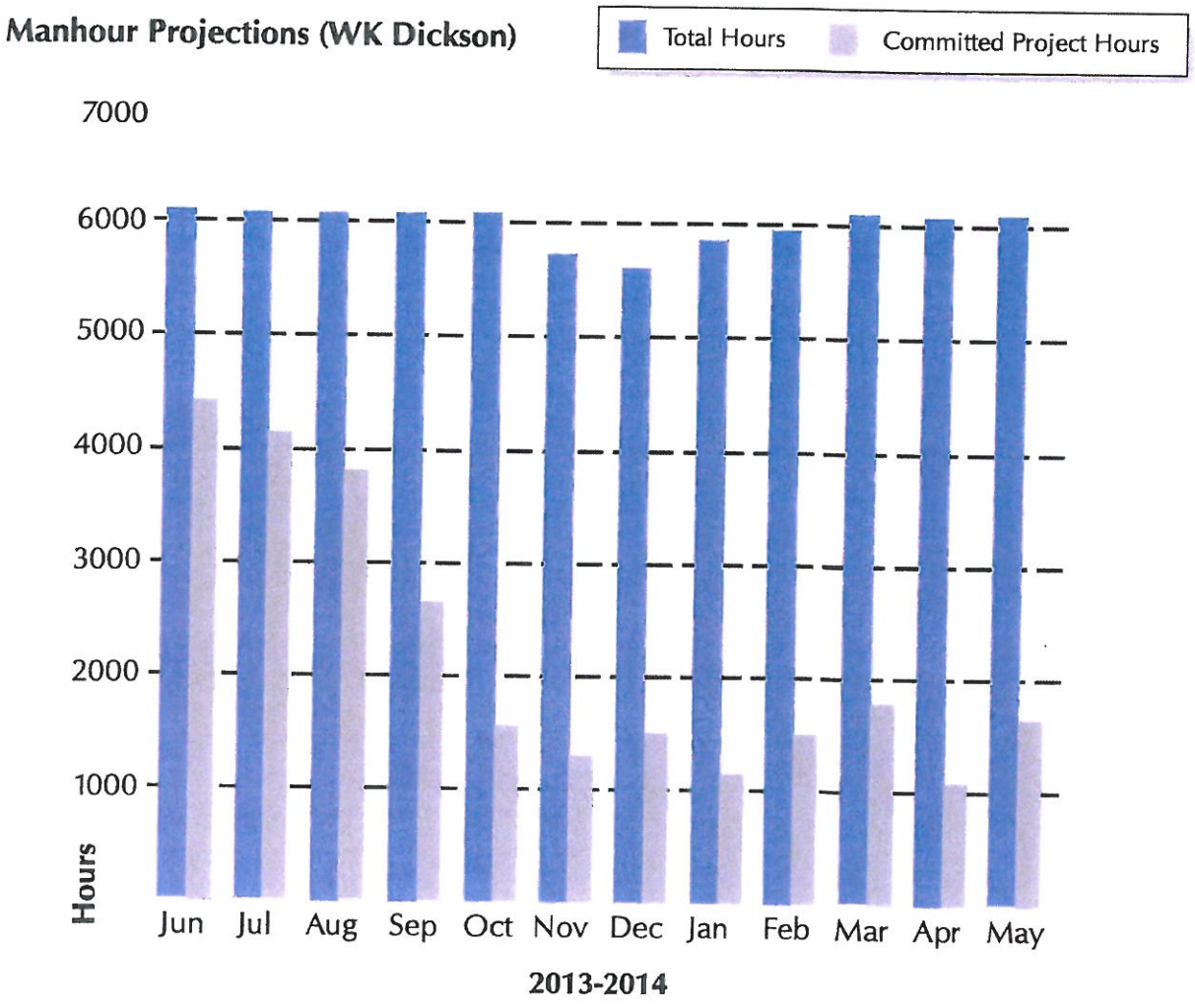
NUTTER & ASSOCIATES REFERENCE

Don Powers
City Manager
City of Thomson, GA
706.595.1781
Project: Biological and Water Quality Monitoring Watershed Assessment and Protection Plan for City of Thomson, Mcduffie County, GA

SCHEDULE & AVAILABILITY

Our current and planned work load for the foreseeable future is such that we have more than adequate time and resources to undertake your project assignments. We have made it a corporate policy not to take on any work that we cannot complete within time and budget constraints. Furthermore, our teaming partners have each committed the availability of the proposed staff members to providing service to AED throughout the course of the assignment. Unlike other firms who regularly employ bait and switch tactics, the people on the organizational chart are the people who will actually perform the work.

The following chart is generated using our state of the art Deltek Resource Management System. It calculates the hours available for staff specifically proposed for this project against the backlog of active contracts they are working on over the next 12 months.



APPENDIX

ADDITIONAL PROJECTS WITH THE CITY OF AUGUSTA

Wilkinson Garden Area Roadway and Drainage Improvements

This project for the Augusta Public Works Department included evaluating the existing stormwater drainage system within a 200-acre subdivision in the Rock Creek Basin of Augusta and making recommendations to limit isolated flooding through updates of the drainage system and construction of stormwater control features. The team provided field inventory of existing stormwater infrastructure of 200-acre Wilkinson Garden subdivision using aerial photography, GPS data collection and conventional survey establishing connectivity where necessary. Also obtained were topographic data for the two areas within the subdivision that have been identified as potential detention ponds.

The team used HEC-HMS to develop hydrologic characteristics and peak flows for 2-, 5-, 25-, 50- and 100-year storm events. The project also included coordination of stakeholder meetings to build community consensus for recommended alternatives; complete permitting applications including USACE 404 permit, 401 certification and compliance with Georgia Stream Buffer rules. Deliverables also included conceptual design recommendations, plans and specifications for the recommended alternative, construction administration and construction observation.

Hyde Park Regional Stormwater Pond

Built on a drained swamp area shortly after World War II, the Hyde Park community in Augusta, Georgia, has experienced numerous flooding events for years due to the large water shed (840-acres) draining through its neighborhoods. Runoff from the highly urbanized area has also impacted the water quality of the downstream Rocky Creek Tributary.

To alleviate flooding in the area and improve water quality, WK Dickson provided surveying and engineering services to construct a 44-acre regional stormwater bio-retention pond with newly create wetlands.

The property values in Hyde Park have significantly been reduced due to the crime, drugs and unemployment that plague the neighborhood. It is the City's intent to purchase the land in Hyde Park to relocate the residents and convert the property into a regional stormwater system. The project is scheduled to start construction in late 2013.

10th Street Sewer Replacement

The Augusta Utilities Department was experiencing sewer pipe failures in the downtown area and needed emergency engineering services to quickly restore service with minimal disruption to customers. The project replaced a 36-inch brick arch sewer pipe in the downtown area along 10th Street which had a recent pipe collapse occurring at the intersection of Ellis Street and 10th Street. The demands for this project required a team effort, including the utility staff members, the contractor, and permitting agencies such as

APPENDIX

GDOT. Utility relocations in congested downtown areas are always challenging to perform cost-effectively and without impact to other important utilities – and this project was no exception. But the project was completed well inside the owner's constraints, with minimal impact to local businesses.

Powell Road Water Main

As part of the 2004 Bond Program, Augusta Utilities needed to install a new distribution line along Powell Road to serve rapid residential growth in the area and to supply a critical system loop. WK Dickson provided professional engineering services for the installation of a new water main to be installed along Powell Road. The water main extended from Flagler Road to the existing water main on Powell Road. The project consisted of approximately 7,900 LF of 12-inch diameter ductile iron pipe.

The project presented multiple challenges to our design team – from difficult stream and railroad crossings, to tight site conditions, the project design addressed all of these challenges with a comprehensive team approach in order to maximize the budget.

Mid City Sanitary Sewer Replacement at Chafee Park

This project involved professional engineering services related to the design and construction of the Mid-City Interceptor Replacement at Chaffee Park for the Augusta Utilities Department. WK Dickson proposed to provide professional land surveying and design engineering services for the proposed sanitary sewer main project which consisted of approximately 1,700 LF of 36" diameter ductile iron pipe that connected at one end to an existing manhole east of the intersection of Division Street and Pearl Avenue, and then connected to the opposite end to an existing manhole located west of the Augusta Canal and north of Broad Street. The proposed sanitary sewer main is located west of the Augusta Canal on property owned by the City of Augusta, Georgia. This sanitary sewer parallels the Augusta Canal approximately 125' from the edge of the canal. Due to the condition of the line, it was recommended that the new outfall line be installed further from the canal to facilitate laying conditions.

The Interceptor System transports sanitary sewage to the James B. Messerly WWTP for treatment. The Main Interceptor was constructed in the 1950's in accordance with the 1952 Master Plan. The City began upgrading the Rae's Creek Sewer in the late 70's which continued into the 1990's in order to accommodate growth that exceeded predictions in the 1952 Master Plan. The Interceptor was then completed in 1964 and collects sanitary sewage from numerous basins, including the Rae's Creek basin and has operated above capacity (surcharged) for a considerable period of time.

Augusta, GA Engineering Department

FEE SCHEDULE

CONSULTANT SERVICES AGREEMENT
PROFESSIONAL SERVICES TO ASSESS & ANALYZE WATERSHEDS, INVENTORY STORMWATER FACILITIES & STORM CONVEYANCE
PROJECT NUMBER: 328-041110-211828002

				SNSA	
Date: **January 8, 2014**					
Phase 1: Data Inventory and Assessment					
Task A: Digital Conversion			it Price ($0	Quantity	Cost
A.1	Review of existing images		0	0	0
A.2	Georeference and Rectify s AED.		0	0	0
A.3	Add rectified imagery to a database with relevant dra		0	0	0
A.4	Digitize features on rectifi				
A.4.1	Digitize all available inform		0	0	0
A.4.2	Digitize only structure type		0	0	0
Task B: Inventory Closed Pipe and Open Conve					
B.1	Asset Inventory & Assessm				
	B.1.1	Closed Str			
	B.1.2	Ditch Struc			
B.2	Management and QA/QC o		0	0	0
B.3	Survey Grade Asset Collect				
	B.3.1	Survey Gra	0	0	0
	B.3.2	Survey Gra surveying	0	0	0
Task C: Inventory Receiving Streams					
C.1	Stream Walk & Geomorphi		550.00	72	$ 39,600.00
C.2	Document Outfalls		200.00	20	$ 4,000.00
C.3	FEMA Cross-Section, 4-poi		200.00	100	$ 20,000.00
C.4	Final Report				
Task D: Rain Gage Installation					
D.1	Review Equipment and Ga		10,000.00	1	$ 10,000.00
D.2	Install Raingages and Level		2,840.00	14	$ 39,760.00
D.3	Monitor Raingages to ensu		6,700.00	12	$ 80,400.00
Task E: Project Coordination Meetings					
E.1	Monthly Status Meeting to				
Phase 2: Modeling Effort					
	To Be Scoped as Funds are				$ 193,760.00
Phase 3: Water Quality Monitoring Effort					
	To Be Scoped as Funds are				

Augusta, GA Engineering Department

ADDENDUM(S)

CONSULTANT SERVICES AGREEMENT
PROFESSIONAL SERVICES TO ASSESS & ANALYZE WATERSHEDS, INVENTORY STORMWATER FACILITIES & STORM CONVEYANCE
PROJECT NUMBER: 328-041110-211828002

Augusta GEORGIA

Procurement Department

Mrs. Geri Sams, Director

MAILED

TO: All Bidders
Phyllis Mills, Quality Assurance Analyst
Abie Ladson, Augusta Engineering Department

FROM: Geri Sams GASams/sp
Procurement Director

DATE: May 31, 2013

SUBJ: Clarifications to the Specifications

RFQ ITEM: **RFQ #13-149 Professional Services to Assess & Analyze Watersheds, Inventory Stormwater Facilities & Storm Conveyance for Engineering Department**

RFQ DATE: **Friday, June 21, 2013 @ 11:00 a.m.**

ADDENDUM NO. 1

This Addendum shall form a part of the referenced RFQ Item: 13-149, and any agreement entered into in connection therewith equally as if bound into the original document. Acknowledge receipt of this addendum on the Attachment B form.

Clarifications to Specifications

Stormwater Utility Implementation Plan as noted per RFQ specifications on page 27 of 33. (Attached)

Please acknowledge addendum in your submittal

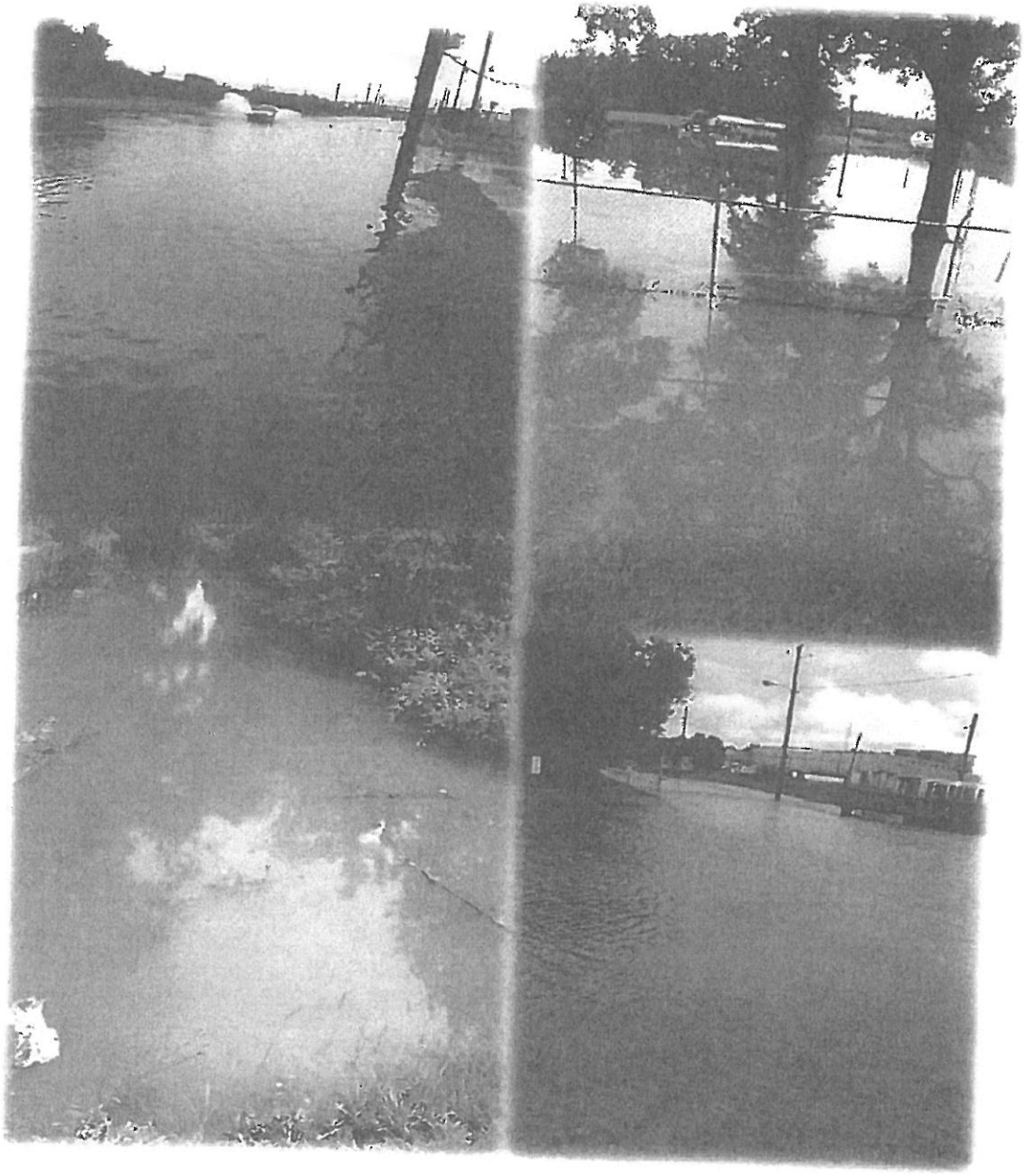
END ADDENDUM

Attachments: Stormwater Utility Implementation Plan (58 pages)

Room 605 - 530 Greene Street, Augusta Georgia 30901
(706) 821-2422 - Fax (706) 821-2811
www.augustaga.gov
Register at www.demandstar.com/supplier for automatic bid notification

Scan this QR code with your smartphone or camera equipped tablet to visit the Augusta, Georgia

STORMWATER UTILITY IMPLEMENTATION PLAN



CITY OF AUGUSTA, GA
ENGINEERING DEPARTMENT
AUGUST 2012

TABLE OF CONTENTS

1

CITY OF AUGUSTA, GA

STORMWATER IMPLEMENTATION PLAN

WWW.AUGUSTAGA.GOV

Augusta
GEORGIA

PRESENTATION CONTENTS

- INTRODUCTION/BACKGROUND
- PROBLEM STATEMENT
- STORMWATER IMPLEMENTATION TEAM
- ESTIMATED REVENUES AND EXPENDITURES
- PROGRAM GOALS AND OBJECTIVE
- OVERALL IMPLEMENTATION SCHEDULE

INTRODUCTION/BACKGROUND

INTRODUCTION/BACKGROUND

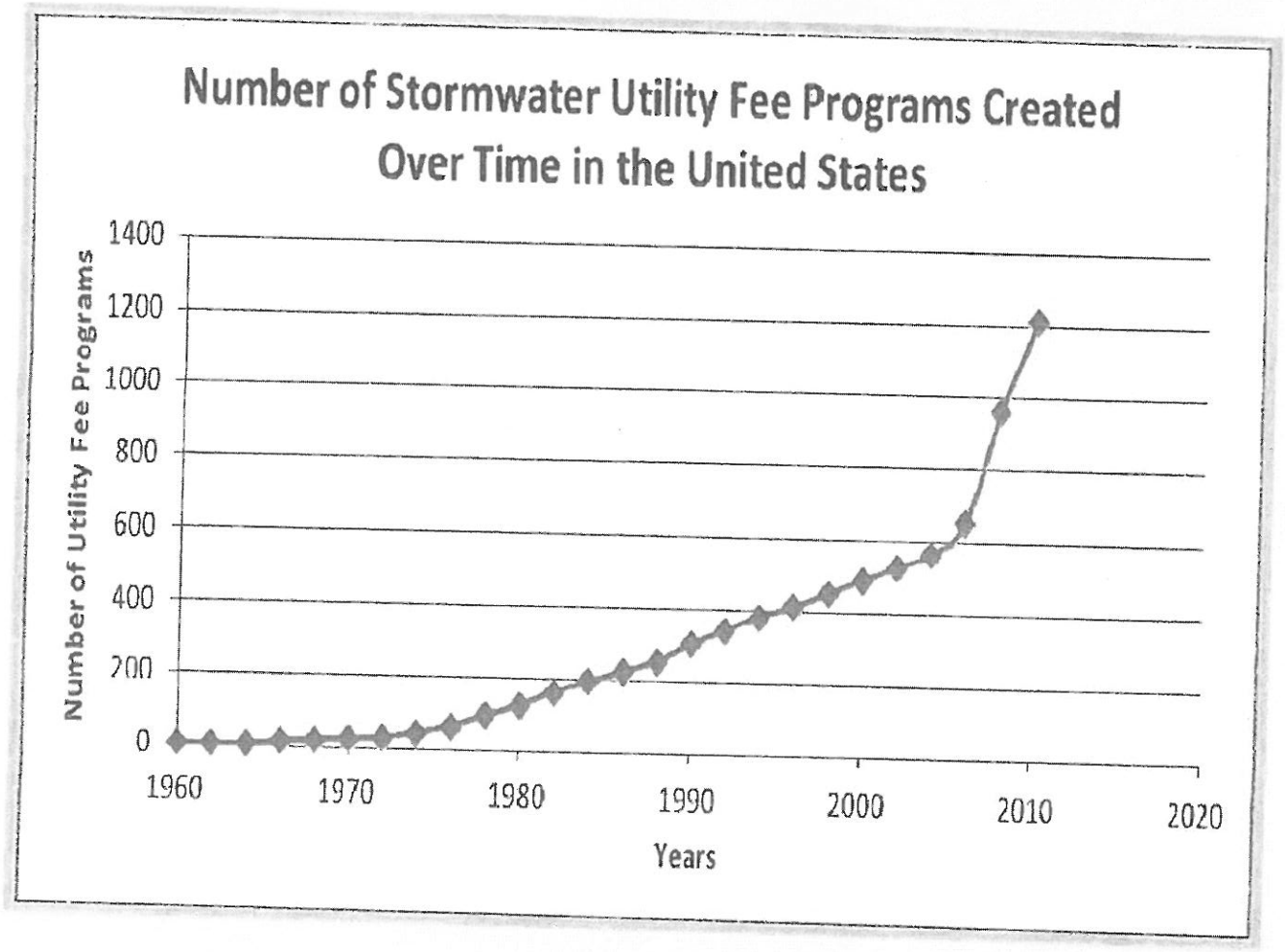
- A stormwater utility is a program that collects fees related to the control and treatment of stormwater.

- Stormwater management is a state and federally-mandated program that requires the City to regulate and monitor stormwater in an effort to reduce pollution. However, federal or state governments do not provide funding.

- Revenues needed to support this mandated program are provided through a Stormwater Utility.

- Property owners are billed a flat rate based on the amount of impervious area (areas covered by concrete, asphalt, residences, buildings, etc.).

- Includes single family homes, mobile homes, multi-family dwellings, condominiums, industry and commercial, and governmental properties. The formula for determining non-residential property fees is as follows: An Equivalent Residential Unit (ERU) is equal to the average impervious area determined from all residential units in the City.


Number of Stormwater Utility Fee Programs Created Over Time in the United States
Number of Utility Fee Programs
1400
1200
1000
800
600
400
200
0
1960
1970
1980
1990
2000
2010
2020
Years

SUROUNDING MUNICIPALITIES THAT HAVE IMPLEMENTED A STORMWATER UTILITY FEE PROGRAM

- Columbia County, GA
- City of North Augusta, SC
- Aiken County, SC
- City of Griffin, GA
- City of Covington, GA
- City of Conyers, GA
- City of Decatur, GA
- Douglasville-Douglas County, GA
- DeKalb County, GA
- City of Fayetteville, GA
- Gilmer County, GA
- City of Smyrna, GA

PROBLEM STATEMENT

MAJOR REASONS FOR THE CITY OF AUGUSTA, GA TO IMPLEMENT A STORMWATER UTILITY PROGRAM

- Funding to help comply with the current State and Federal regulations and guidelines (e.g., Detection of illicit connections to storm sewers).

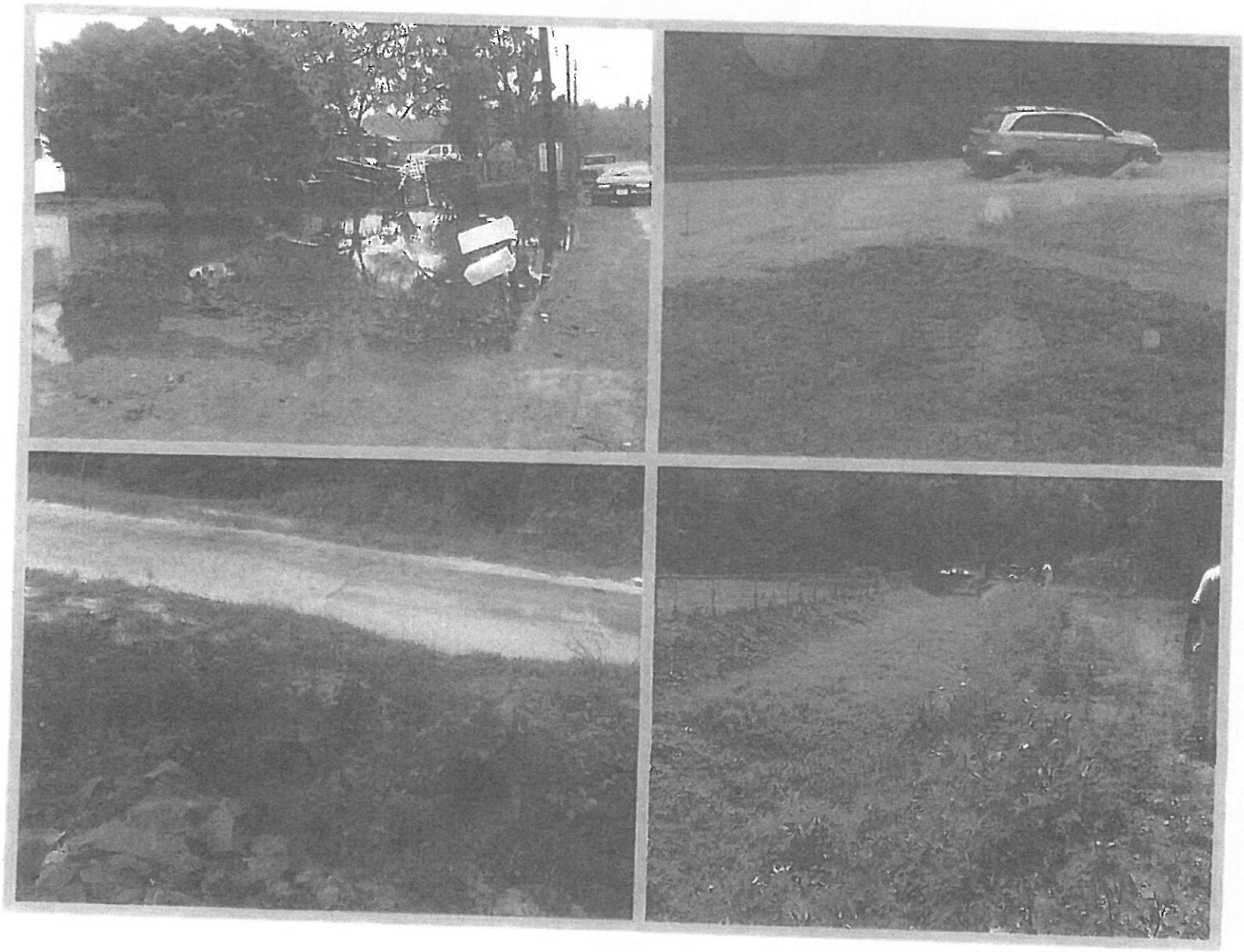
- Improve maintenance of countywide easements and right-of-ways, pipe systems, culverts/bridges, detention/retention ponds, levee, curb and gutter, and lakes/ponds.

- Replace or improve the aged stormwater infrastructure.

- Implement Watershed Master Plan for both short and long-term planning purposes.

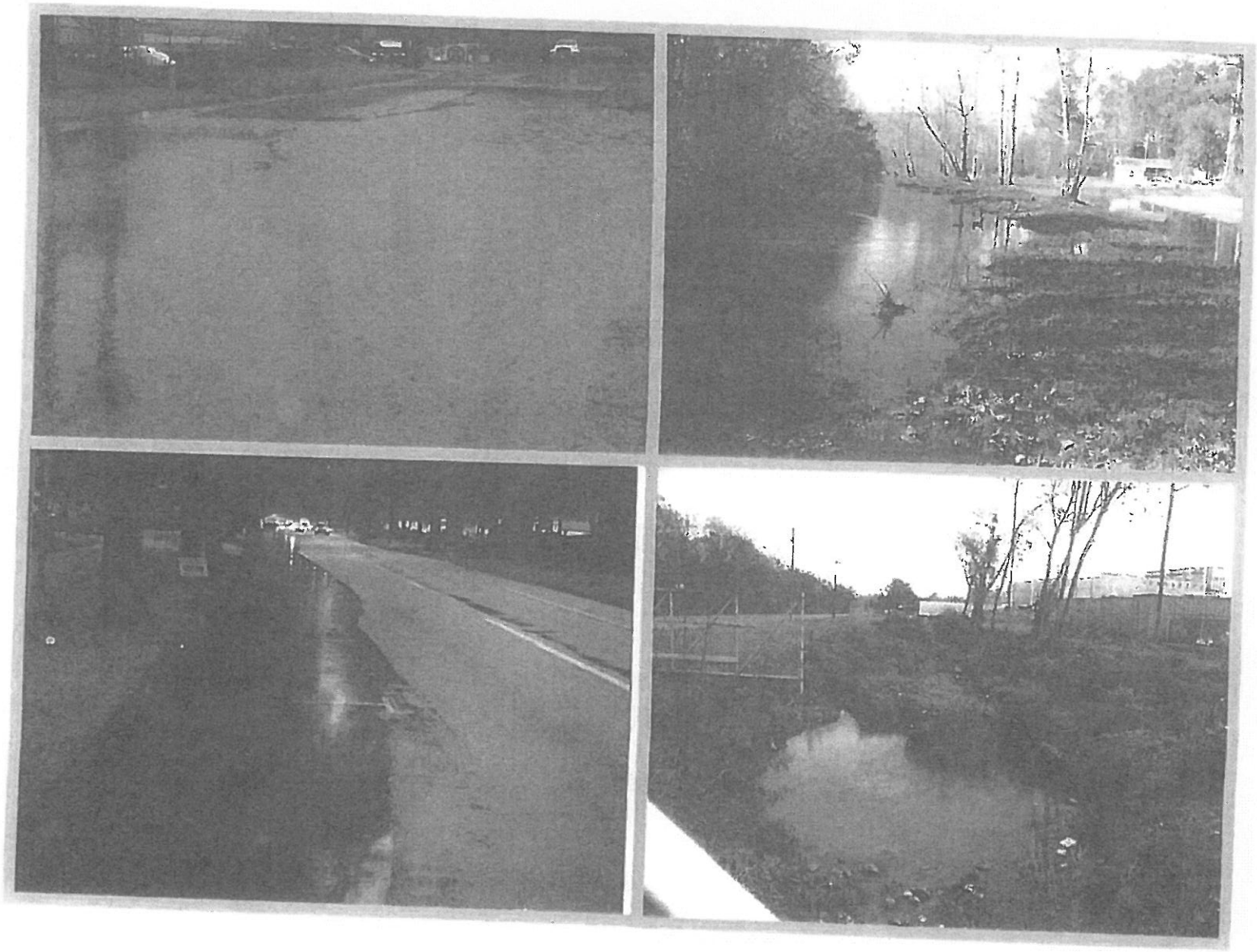
- Improve efficiency of customer services as it relates to stormwater.


35



WWW.AUGUSTAGA.GOV

Augusta
GEORGIA



WWW.AUGUSTAGA.GOV

Augusta
GEORGIA

STORMWATER IMPLEMENTATION TEAM

WWW.AUGUSTAGA.GOV

Augusta
GEORGIA

CITY OF AUGUSTA, GA STORMWATER TEAM

PROPOSED IN-HOUSE TEAM

- Commissioners and Administration
- Engineering Department
- Information Technology Department
- Planning and Development Department
- Utilities Department
- Environmental Services Department
- Parks, Recreation, and Facilities Department
- Finance Department
- Law Department

CITY OF AUGUSTA, GA STORMWATER TEAM

POSSIBLE OUTSIDE ORGANIZATIONAL TEAM

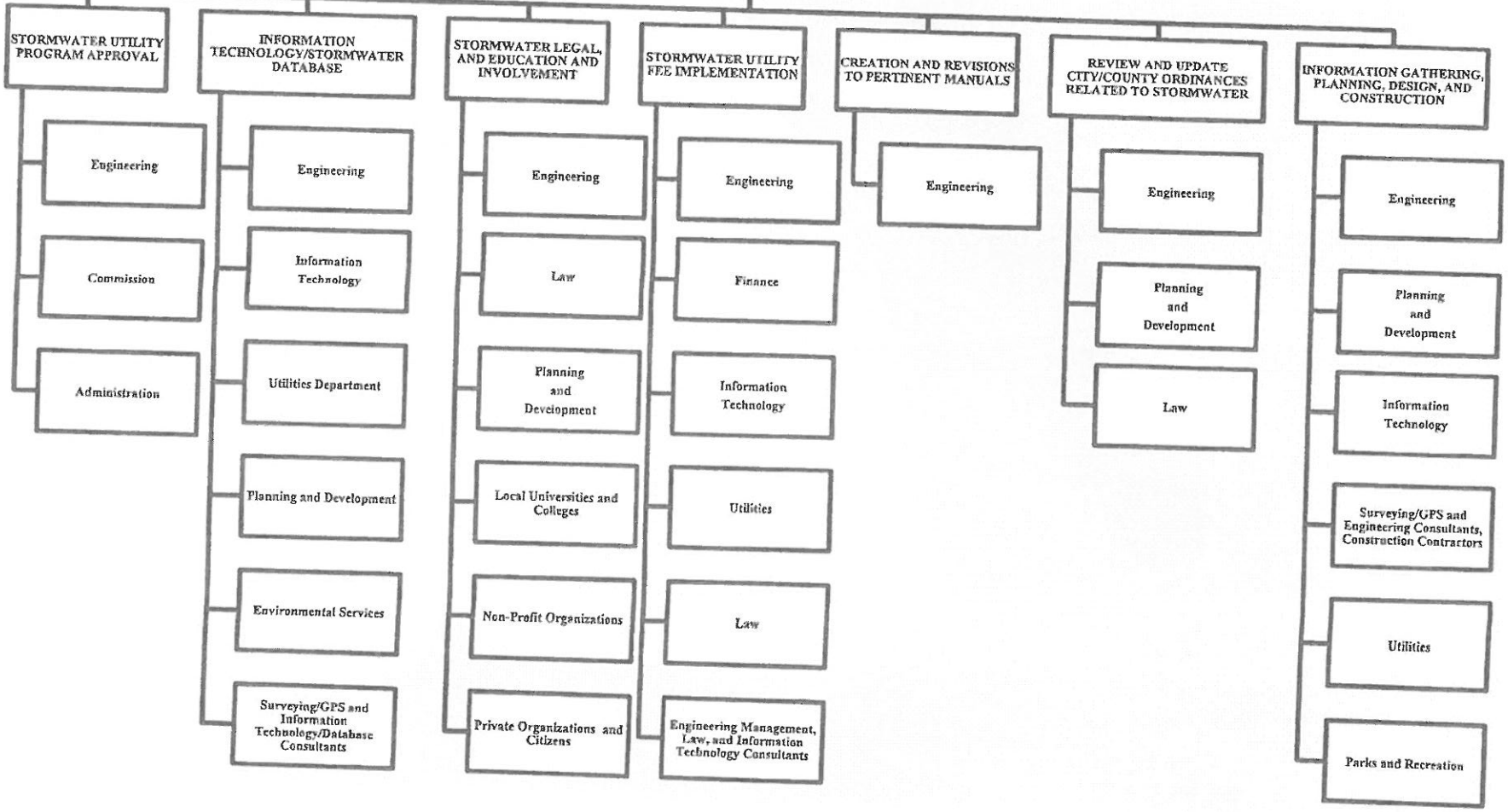
- Southeastern Natural Sciences Academy
- Richmond County Citizens
- Private Businesses
- Augusta State University
- Paine College
- Augusta Technical College
- Augusta Neighborhood Alliance Association
- River Keepers
- Richmond County Board of Education
- Neighborhood Associations

CITY OF AUGUSTA, GA STORMWATER TEAM

REQUIRED CONSULTANTS/CONTRACTORS TEAM

- **Engineering Management Consultant** (Experience and success with Stormwater Implementation)
- **Law/Legal Consultant** (Experience and success with Stormwater Implementation)
- **Public Relations Consultant** (Experience and success with Stormwater Implementation)
- **Surveying/GPS Consultant(s)**
- **Engineering Consultants** (9) (Watershed Assessment and Analysis)
- **Information Technology/Database Consultant**
- **Construction Contractors**

CITY OF AUGUSTA, GA
STORMWATER IMPLEMENTATION PROGRAM



ESTIMATED COST SUMMARY

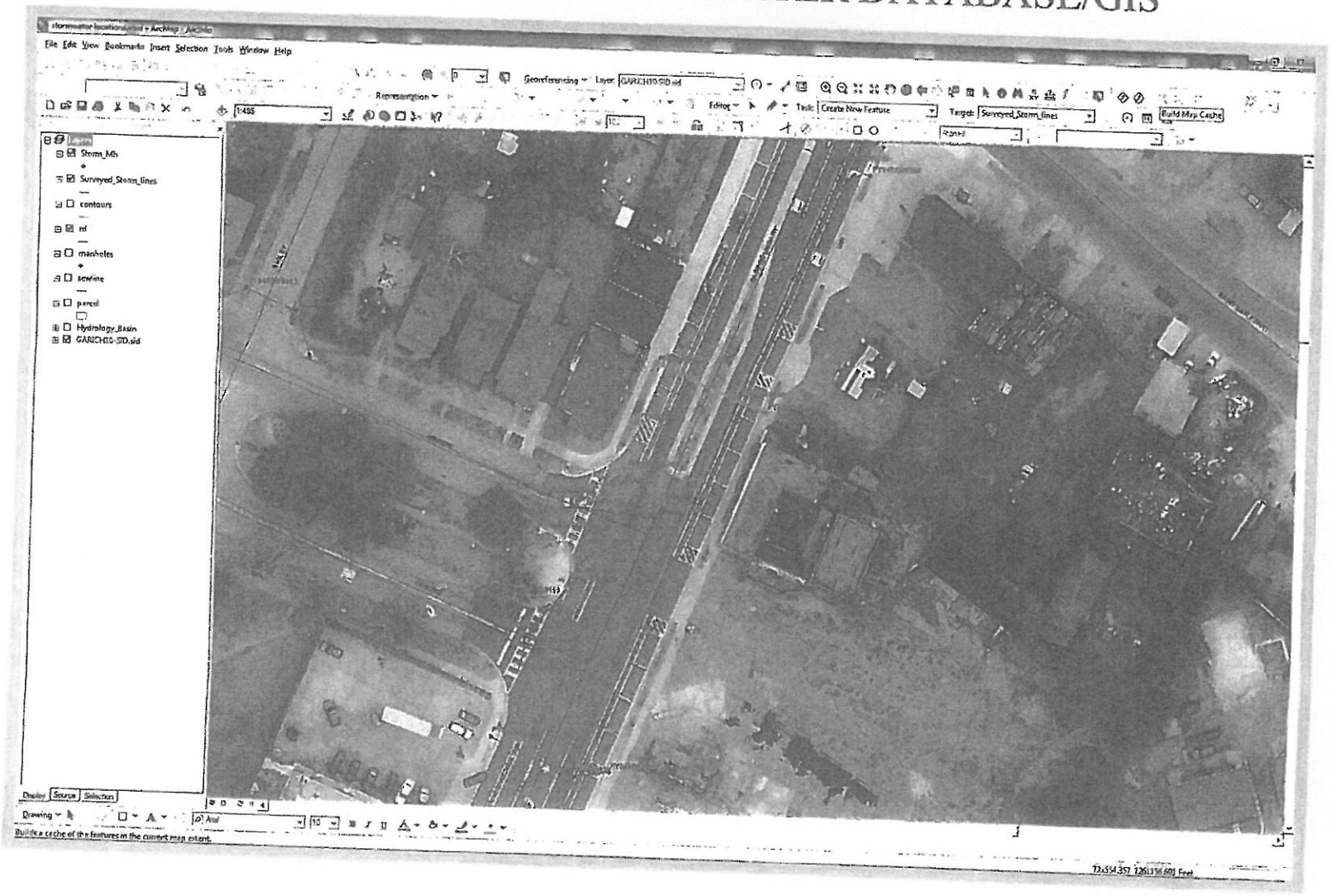
5-YEAR ESTIMATED PROGRAM REVENUE	COST
Allocated Funds for Program Implementation (SPLOST VI):	$3,500,000
Estimated Utility Fees:	$42,903,900
SPLOST VI (Salaries):	$7,055,831
SPLOST VI (Capital Improvement Projects):	$27,375,000
SPLOST VI (Operation and Preventative Maintenance):	$0
Estimated NPDES Fees:	$308,000
TOTAL:	**$81,142,731**

5-YEAR ESTIMATED PROGRAM EXPENDITURE	COST
Program Supervision and Development:	$17,503,826
NPDES Compliance:	$1,211,000
Engineering:	$6,905,000
Enforcements:	$155,000
Operation and Preventative Maintenance:	$25,590,000
Drainage Related Capital Improvement Projects:	$65,430,000
Equipment:	$3,300,000
Material Purchase (Annually):	$600,000
TOTAL:	**$120,694,826**

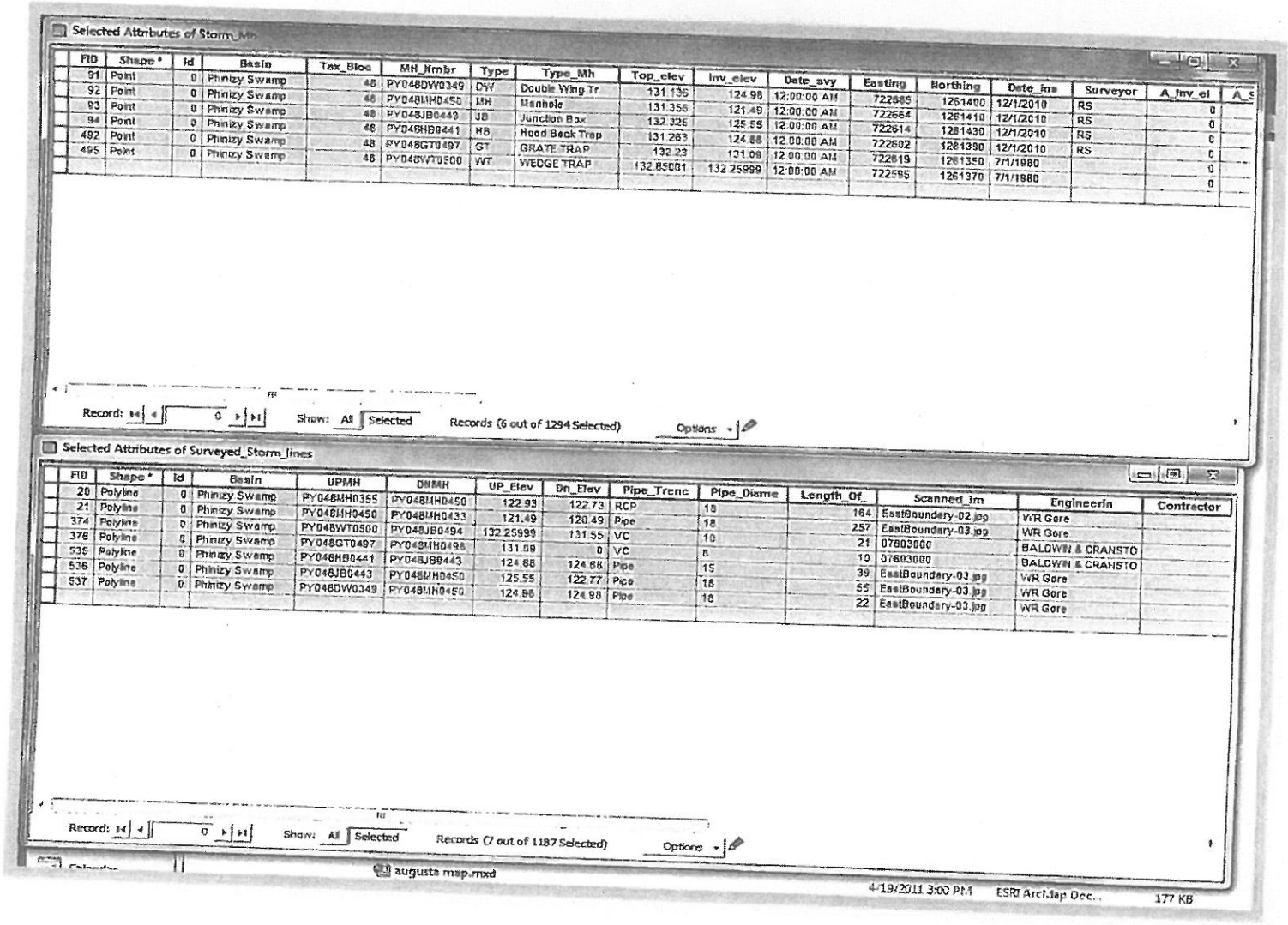
NOTE: An estimated SPLOST 7 is not included in the 5-Year Estimated Program Revenue

PROGRAM GOALS AND OBJECTIVE

COMPREHENSIVE STORMWATER DATABASE/GIS



COMPREHENSIVE STORMWATER DATABASE/GIS



Selected Attributes of Storm_Mh

FID	Shape *	Id	Basin	Tax_Bloc	MH_Nmbr	Type	Type_Mh	Top_elev	Inv_elev	Date_svy	Easting	Northing	Date_ins	Surveyor	A_Inv_el	A_S
91	Point	0	Phinizy Swamp	48	PY048DW0349	DW	Double Wing Tr	131.136	124.98	12:00:00 AM	722685	1261400	12/1/2010	RS	0	
92	Point	0	Phinizy Swamp	48	PY048MH0450	MH	Manhole	131.358	121.49	12:00:00 AM	722664	1261410	12/1/2010	RS	0	
93	Point	0	Phinizy Swamp	48	PY048JB0443	JB	Junction Box	132.325	125.55	12:00:00 AM	722614	1261430	12/1/2010	RS	0	
94	Point	0	Phinizy Swamp	48	PY048HB0441	HB	Hood Back Trap	131.263	124.88	12:00:00 AM	722602	1261390	12/1/2010	RS	0	
492	Point	0	Phinizy Swamp	48	PY048GT0497	GT	GRATE TRAP	132.23	131.09	12:00:00 AM	722619	1261350	7/1/1980		0	
495	Point	0	Phinizy Swamp	48	PY048WT0500	WT	WEDGE TRAP	132.85001	132.25999	12:00:00 AM	722595	1261370	7/1/1980		0	

Record: 0 Show: All Selected Records (6 out of 1294 Selected) Options

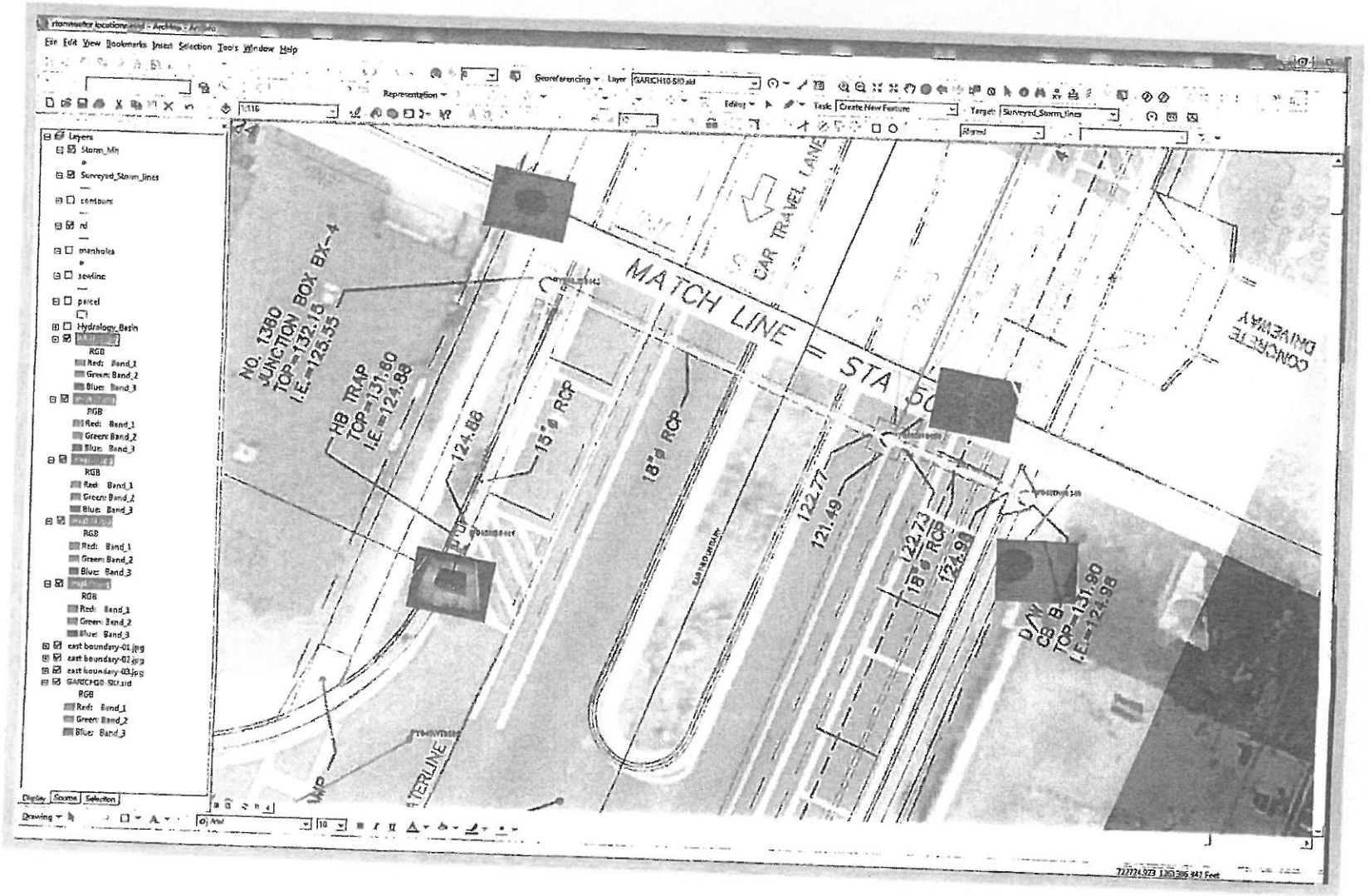
Selected Attributes of Surveyed_Storm_lines

FID	Shape *	Id	Basin	UPMH	DNMH	UP_Elev	Dn_Elev	Pipe_Trenc	Pipe_Diame	Length_Of	Scanned_Im	Engineerin	Contractor
20	Polyline	0	Phinizy Swamp	PY048MH0355	PY048MH0450	122.93	122.73	RCP	15	164	EastBoundary-02.jpg	WR Gore	
21	Polyline	0	Phinizy Swamp	PY048MH0450	PY048MH0433	121.49	120.49	Pipe	18	257	EastBoundary-03.jpg	WR Gore	
374	Polyline	0	Phinizy Swamp	PY048WT0500	PY048JB0494	132.25999	131.55	VC	10	21	07803000	BALDWIN & CRANSTO	
378	Polyline	0	Phinizy Swamp	PY048GT0497	PY048MH0496	131.09	0	VC	6	10	07803000	BALDWIN & CRANSTO	
535	Polyline	0	Phinizy Swamp	PY048HB0441	PY048JB0443	124.88	124.88	Pipe	15	39	EastBoundary-03.jpg	WR Gore	
536	Polyline	0	Phinizy Swamp	PY048JB0443	PY048MH0450	125.55	122.77	Pipe	18	55	EastBoundary-03.jpg	WR Gore	
537	Polyline	0	Phinizy Swamp	PY048DW0349	PY048MH0450	124.98	124.98	Pipe	18	22	EastBoundary-03.jpg	WR Gore	

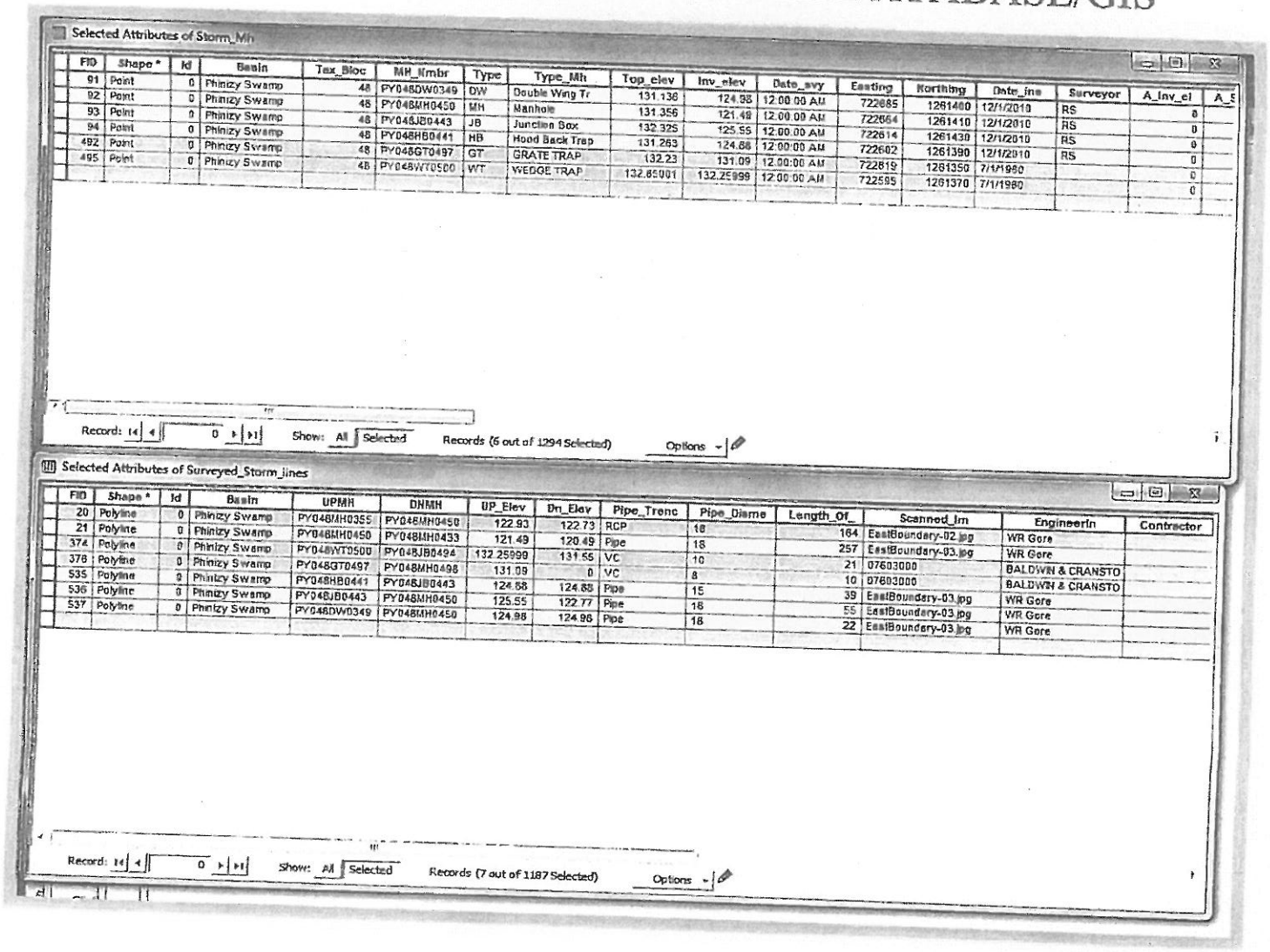
Record: 0 Show: All Selected Records (7 out of 1187 Selected) Options

augusta map.mxd 4/19/2011 3:00 PM ESRI ArcMap Doc... 177 KB

COMPREHENSIVE STORMWATER DATABASE/GIS



COMPREHENSIVE STORMWATER DATABASE/GIS



Selected Attributes of Storm_Mh

FID	Shape *	Id	Basin	Tax_Bloc	MH_Nmbr	Type	Type_Mh	Top_elev	Inv_elev	Date_svy	Easting	Northing	Date_ins	Surveyor	A_Inv_el	A_S
91	Point	0	Phinizy Swamp	48	PY048DW0349	DW	Double Wing Tr	131.136	124.98	12:00:00 AM	722685	1261460	12/1/2010	RS	0	
92	Point	0	Phinizy Swamp	48	PY048MH0450	MH	Manhole	131.356	121.49	12:00:00 AM	722664	1261410	12/1/2010	RS	0	
93	Point	0	Phinizy Swamp	48	PY048JB0443	JB	Junction Box	132.325	125.55	12:00:00 AM	722614	1261430	12/1/2010	RS	0	
94	Point	0	Phinizy Swamp	48	PY048HB0441	HB	Hood Back Trap	131.263	124.88	12:00:00 AM	722602	1261390	12/1/2010	RS	0	
492	Point	0	Phinizy Swamp	48	PY048GT0497	GT	GRATE TRAP	132.23	131.09	12:00:00 AM	722619	1261350	7/1/1980		0	
495	Point	0	Phinizy Swamp	48	PY048WT0500	WT	WEDGE TRAP	132.65001	132.25999	12:00:00 AM	722595	1261370	7/1/1980		0	

Record: 0 Show: All Selected Records (6 out of 1294 Selected) Options

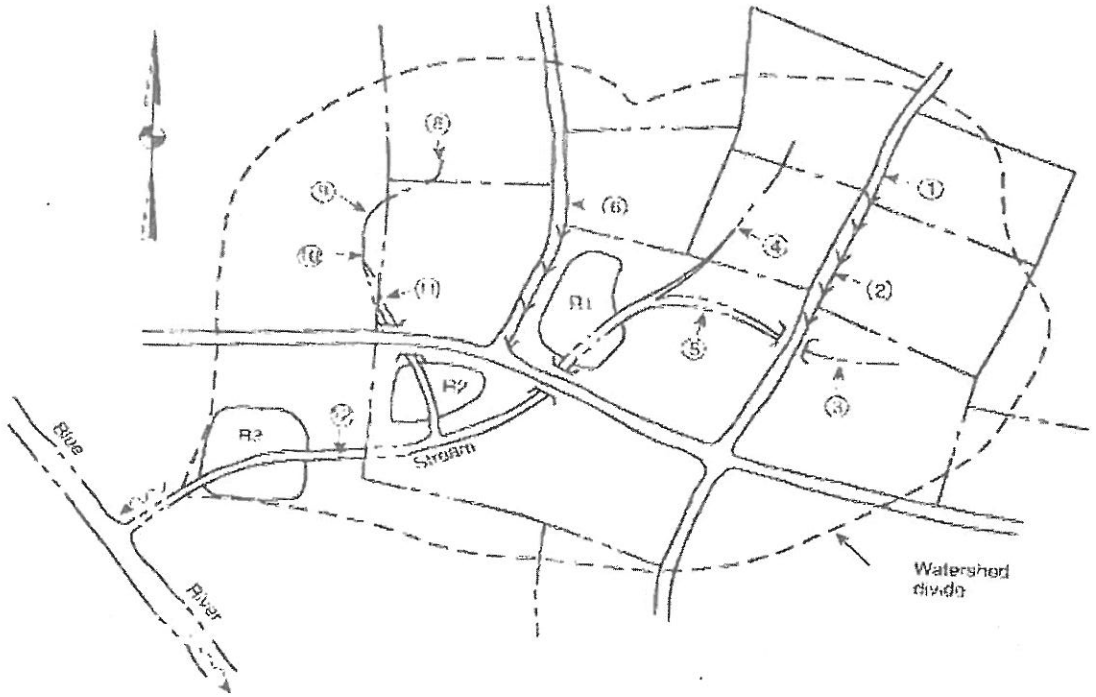
Selected Attributes of Surveyed_Storm_lines

FID	Shape *	Id	Basin	UPMH	DNMH	UP_Elev	Dn_Elev	Pipe_Trenc	Pipe_Dieme	Length_Of_	Scanned_Im	Engineerin	Contractor
20	Polyline	0	Phinizy Swamp	PY048MH0355	PY048MH0450	122.93	122.73	RCP	18	164	EastBoundary-02.jpg	WR Gore	
21	Polyline	0	Phinizy Swamp	PY048MH0450	PY048MH0433	121.49	120.49	Pipe	18	257	EastBoundary-03.jpg	WR Gore	
374	Polyline	0	Phinizy Swamp	PY048WT0500	PY048JB0494	132.25999	131.55	VC	10	21	07603000	BALDWIN & CRANSTO	
378	Polyline	0	Phinizy Swamp	PY048GT0497	PY048MH0498	131.09	0	VC	8	10	07603000	BALDWIN & CRANSTO	
535	Polyline	0	Phinizy Swamp	PY048HB0441	PY048JB0443	124.88	124.88	Pipe	15	39	EastBoundary-03.jpg	WR Gore	
536	Polyline	0	Phinizy Swamp	PY048JB0443	PY048MH0450	125.55	122.77	Pipe	18	55	EastBoundary-03.jpg	WR Gore	
537	Polyline	0	Phinizy Swamp	PY048DW0349	PY048MH0450	124.98	124.98	Pipe	18	22	EastBoundary-03.jpg	WR Gore	

Record: 0 Show: All Selected Records (7 out of 1187 Selected) Options

IMPLEMENTATION OF WATERSHED BASED SHORT/LONG TERM PLANS

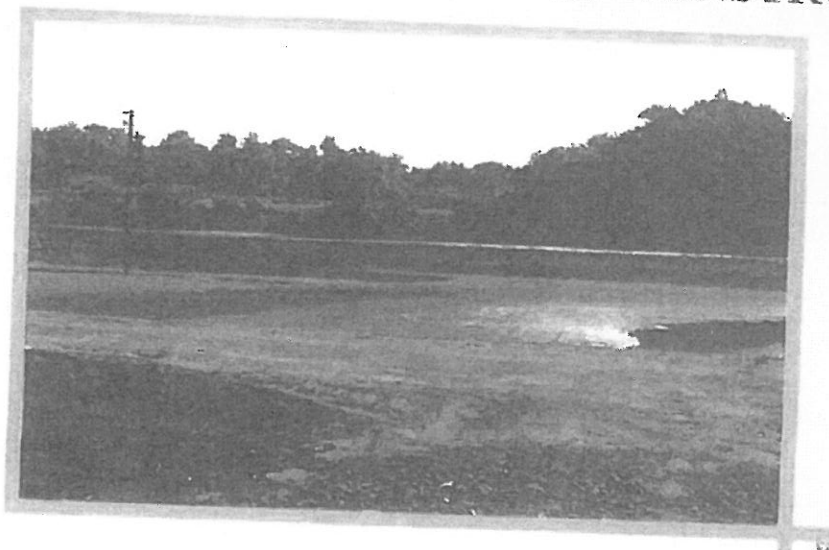
ON-SITE DETENTION PONDS ELIMINATION PROGRAM



On site detention basins versus regional facilities.

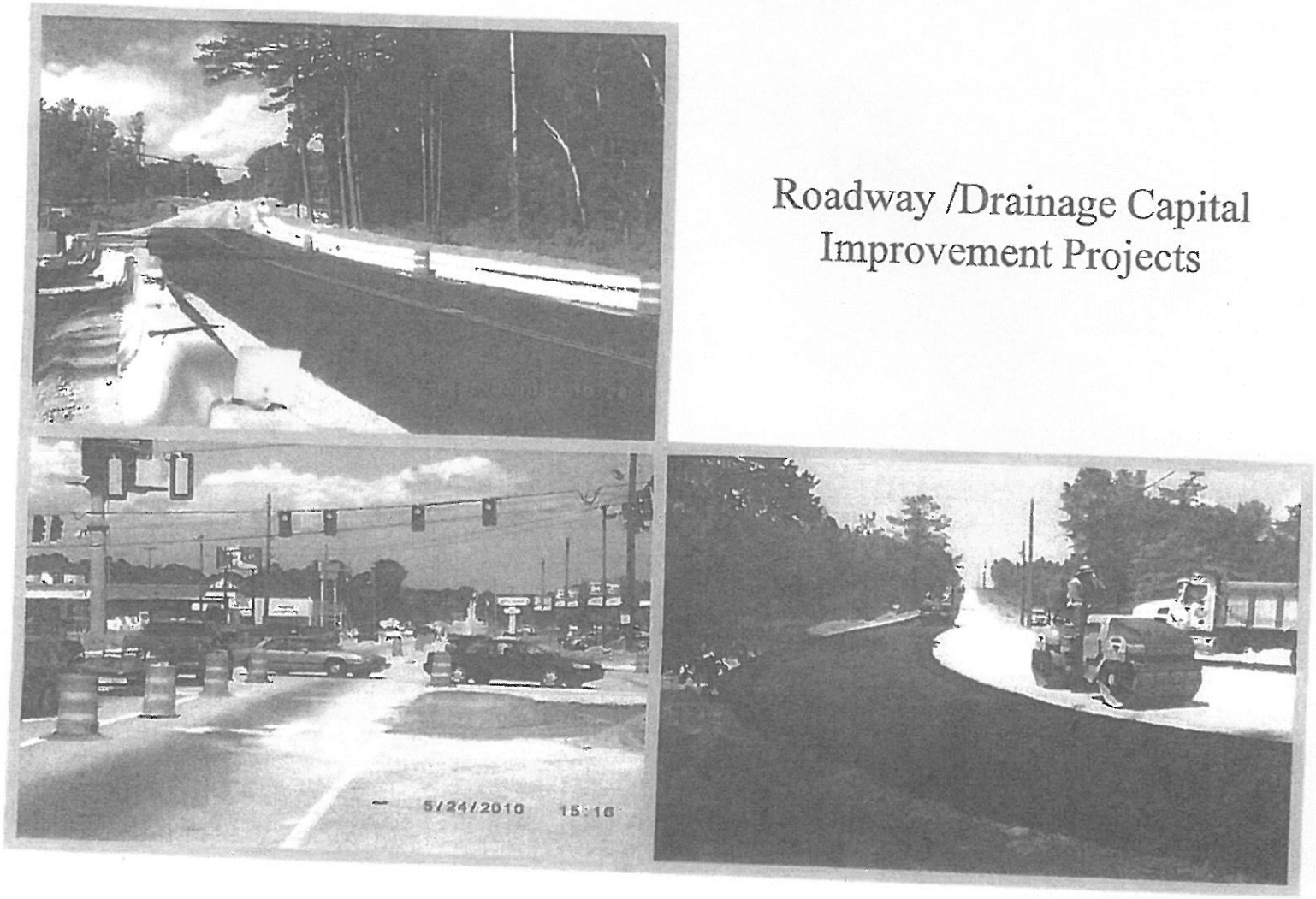
Reference: Introduction to Hydraulics and Hydrology with Applications for Stormwater Management

PROPOSED CONSTRUCTION PROJECTS



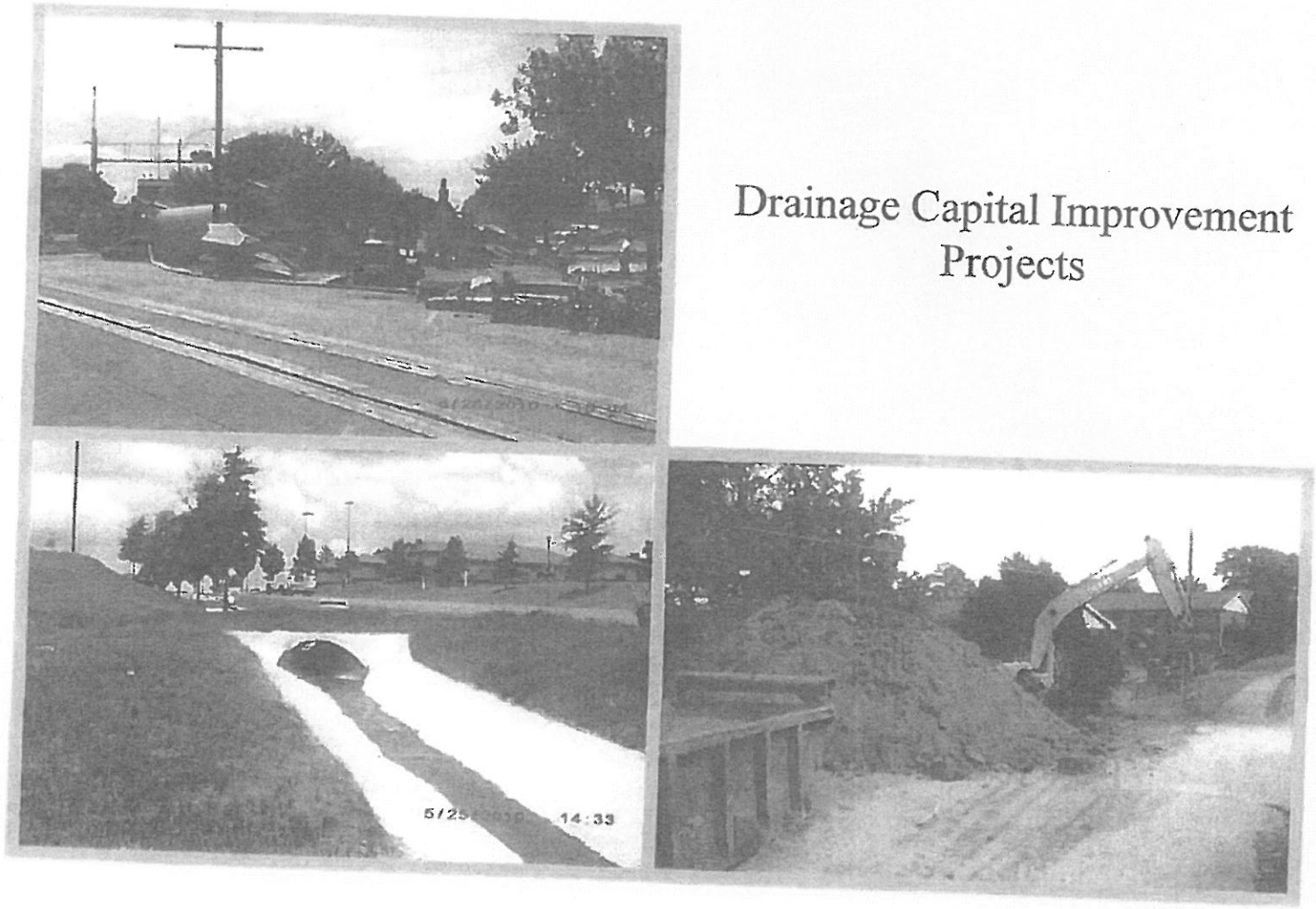
County-wide Lake/Pond Dredging and Best Management Practices (BMP) Implementation

PROPOSED CONSTRUCTION PROJECTS



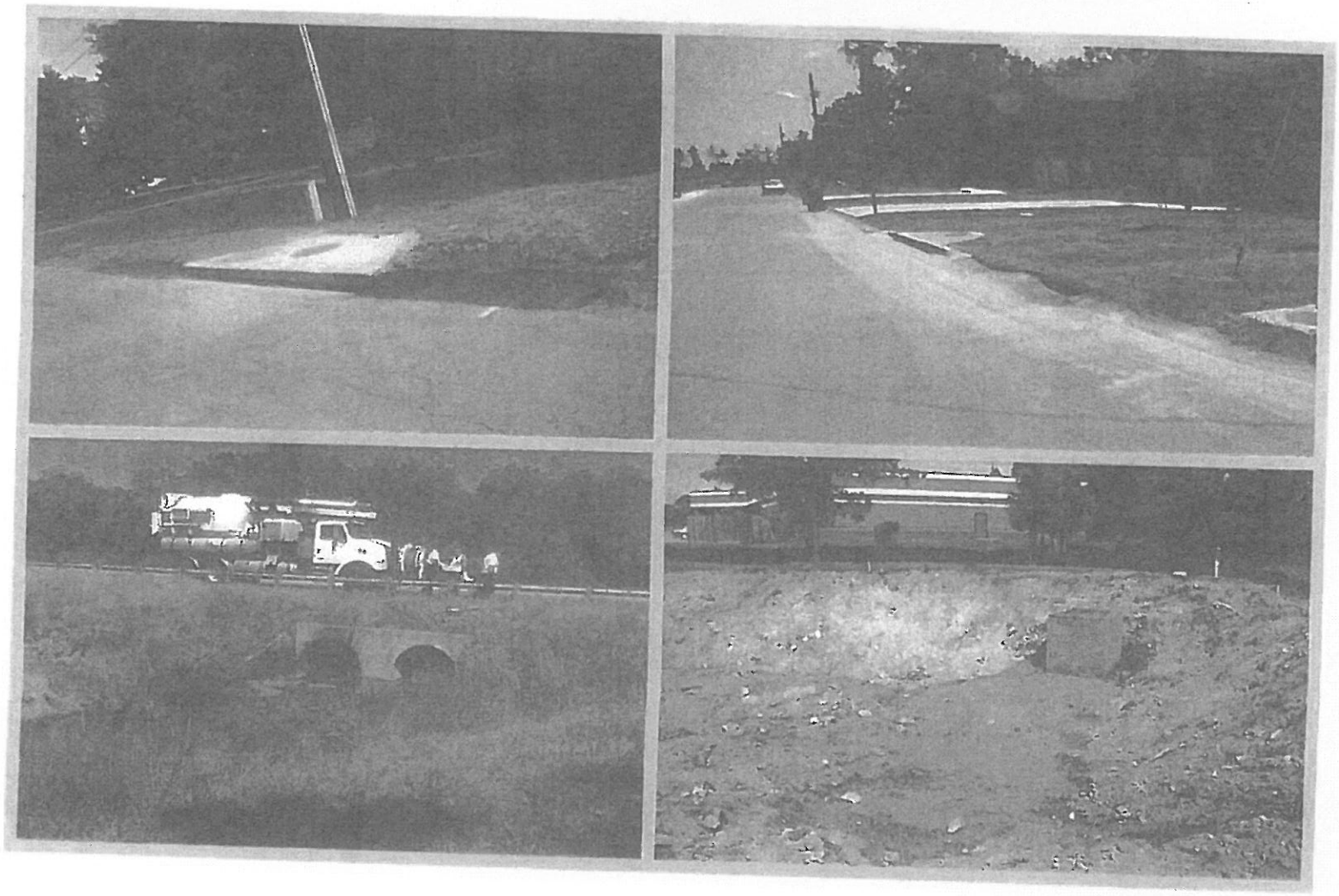
Roadway /Drainage Capital Improvement Projects

DRAINAGE RELATED CONSTRUCTION PROJECTS



Drainage Capital Improvement Projects

DRAINAGE RELATED MAINTENANCE REPAIRS



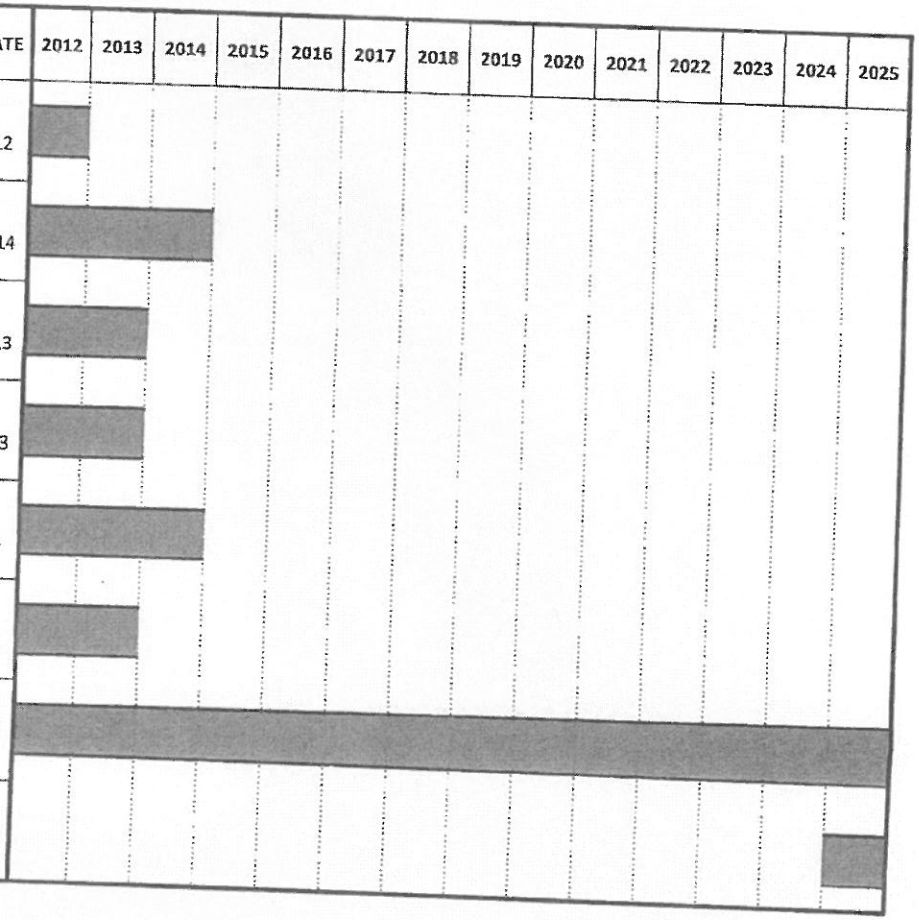
INCREASE MAINTENANCE OPERATIONS

	DESCRIPTION	KNOWN INVENTORY	NUMBER INSPECTED (Per Year)	NUMBER MAINTAINED (Per Year)
INFRASTRUCTURE MAINTENANCE	Catch Basins	12,488 each	3,600 each	905 each
	Ditches	731 miles	900 miles	900 miles
	Detention Ponds	938 each	169 each	228 each
	Storm Drain Pipes	566 miles	268 miles	268 miles
	Street Swepted	802 miles	N/A miles	2,165 miles

OVERALL IMPLEMENTATION SCHEDULE

OVERALL PROJECT SCHEDULE

NO.	ACTIVITY STAGE	DURATION	START DATE	FINISH DATE
1	STORMWATER UTILITY PROGRAM APPROVAL STAGE	131 days	3/20/2012	9/18/2012
2	INFORMATION TECHNOLOGY/STORMWATER DATABASE STAGE	570 days	9/19/2012	11/25/2014
3	STORMWATER LEGAL, AND EDUCATION AND INVOLVEMENT STAGE	288 days	9/19/2012	10/25/2013
4	STORMWATER UTILITY FEE IMPLEMENTATION STAGE	223 days	12/21/2012	10/29/2013
5	CREATION AND REVISIONS TO PERTINENT MANUALS STAGE	462 days	4/17/2012	1/22/2014
6	REVIEW AND UPDATE CITY/COUNTY ORDINANCES RELATED TO STORMWATER STAGE	336 days	4/12/2012	7/25/2013
7	INFORMATION GATHERING, PLANNING, DESIGN, AND CONSTRUCTION STAGE	3537 days	9/19/2012	4/9/2026
8	IMPLEMENTATION AND PROJECTS COMPLETED	1 day	4/10/2026	4/10/2026



2

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

1	**STORMWATER UTILITY PROGRAM APPROVAL STAGE**	**3/20/12**	**9/18/12**	
2	Create Stormwater Concept Plan	3/20/12	4/9/12	Engineering
3	Determine Program Problems, Needs, and Goals	4/10/12	4/16/12	Engineering
4	Disseminate Concept Plan to Staff for Review	4/10/12	4/10/12	Engineering
5	Conduct Concept Stormwater Plan Meeting	4/11/12	4/11/12	Engineering,Planning,IT,Utilities,Law,Environmental,& Fire,Finanace
6	Cost of Service Analysis	4/12/12	4/18/12	Engineering
7	Revise Concept Stormwater Plan	4/12/12	4/18/12	Engineering
8	Present Stormwater Utility Fee Program to Commissioners for Approval	9/18/12	9/18/12	Engineering
9	**INFORMATION TECHNOLOGY/STORMWATER DATABASE STAGE**	**9/19/12**	**11/25/14**	
10	Evaluate Possible Overlapping of Database	9/19/12	1/22/13	IT,Engineering,Utilities
11	Create a Uniform Database (GIS, Stormwater, Sanitary Sewer, GBA, etc.)	1/23/13	4/15/14	IT,Engineering,Utilities
12	Evaluate & Revise Necessary Database Policy	4/16/14	9/2/14	IT
13	Stormwater Database/GIS Implementation	9/3/14	11/25/14	IT
14	**STORMWATER LEGAL, AND EDUCATION AND INVOLVEMENT STAGE**	**9/19/12**	**10/25/13**	
15	RFP - Engineering, Legal & Public Relations Consultant(s) Stormwater Fee Program	9/19/12	10/30/12	Engineering,Law,Planning
16	Select Consultant for Engineering, Legal, & Public Relations (Stormwater Fee Program)	10/31/12	12/11/12	Engineering,Law,Planning
17	Commission Approval of RFP-Engineering, Legal, & Public Relations (Stormwater Fee Program)	12/12/12	12/13/12	Engineering
18	NTP - Consultant for Engineering, Legal, & Public Relations (Stormwater Fee Program)	12/14/12	12/20/12	Engineering
19	Community Assessment	12/21/12	1/10/13	Engineering,Planning,Consultants,Others
20	Develop & Implement a Public Involvement Strategy	1/11/13	1/31/13	Engineering,Planning,Consultants,Others
21	Develop & Implement Stakeholder Participation	1/11/13	2/6/13	Engineering,Planning,Consultants,Others
22	Conduct Meetings and Presentations	2/7/13	10/25/13	Engineering,Planning,Consultants,Others
23	Disseminate Newsletters, fact Sheets, and Brochures	2/7/13	10/25/13	Engineering,Planning,Consultants,Others
24	Conduct Media Campaigns	2/7/13	10/25/13	Engineering,Planning,Consultants,Others
25	Coordination with Neighborhood and Community Groups for Program Support	2/7/13	10/25/13	Engineering,Planning,Consultants,Others
26	**STORMWATER UTILITY FEE IMPLEMENTATION STAGE**	**12/21/12**	**10/29/13**	
27	Create Funding Policy	12/21/12	1/10/13	Engineering,Finance,Consultants
28	Determine the Detailed Legalality of a Financing Mechanism	1/11/13	2/21/13	Engineering,Finance,Consultants
29	Perform Rate Study Analysis and Cash Flow Analysis	2/22/13	4/4/13	Engineering,Finance,Consultants
30	Develop a Short and Long-tern Business Plan for the Proposed Stormwater Program	4/5/13	4/25/13	Engineering,Finance,Consultants
31	Create a Stormwater Fee Ordinance	4/26/13	5/16/13	Engineering,Finance,Consultants
32	Develop a Stormwater Master Account System	5/17/13	6/13/13	Engineering,IT,Finance,Consultants
33	Commission Approval of Stormwater Ordinance	5/17/13	5/17/13	Engineering
34	Develop Stormwater Billing System	6/14/13	8/15/13	Engineering,IT,Finance,Consultants
35	Implement Pilot Billing System	8/16/13	9/27/13	Engineering,IT,Finance,Consultants
36	Make Billing System Adjustments	9/30/13	10/28/13	Engineering,IT,Finance,Consultants
37	Billing System Live On-line	10/29/13	10/29/13	Engineering,IT,Finance,Consultants
38	**CREATION AND REVISIONS TO PERTINENT MANUALS STAGE**	**4/17/12**	**1/22/14**	
39	Draft a Stormwater Design, Construction, and Operation and Maintenance Manual	4/17/12	1/21/13	Engineering
40	Staff to review Draft Design, Construction, and Operation and Maintenance Manual	1/22/13	2/18/13	Engineering
41	Finalize Draft Design, Construction, and Operation and Maintenance Manual	2/19/13	3/18/13	Engineering
42	Commission Approval of Design, Construction, and Operation and Maintenance Manual	3/19/13	3/19/13	Engineering
43	Review current Design and Construction Manual (Roadway, Streets, and Bridges)	3/20/13	12/24/13	Engineering
44	Revise and make necessary changes to the Design and Construction Manual (Roadway, Streets, and Bridges)	12/25/13	1/21/14	Engineering
45	Commission Approval of Design and Construction Manual (Roadway, Streets, and Bridges)	1/22/14	1/22/14	Engineering
46	**REVIEW AND UPDATE CITY/COUNTY ORDINANCES RELATED TO STORMWATER STAGE**	**4/12/12**	**7/25/13**	

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

47	Review Zoning Ordinance	4/12/12	7/4/12	Engineering,Planning
48	Revise Zoning Ordinance	7/5/12	7/25/12	Engineering,Planning
49	Commission Approval of Revised Zoning Ordinance	7/26/12	7/26/12	Engineering,Planning
50	Review Erosion and Sediment Control Ordinance	7/27/12	9/6/12	Engineering
51	Revise Erosion and Sediment Control Ordinance	9/7/12	9/27/12	Engineering
52	Commission Approval of Revise Erosion and Sediment Control Ordinance	9/28/12	9/28/12	Engineering
53	Review Grading Ordinance	10/1/12	11/9/12	Engineering,Planning
54	Revise Grading Ordinance	11/12/12	11/30/12	Engineering,Planning
55	Commission Approval of Revise Grading Ordinance	12/3/12	12/3/12	Engineering
56	Review Stormwater Ordinance	12/4/12	1/14/13	Engineering
57	Revise Stormwater Ordinance	1/15/13	2/4/13	Engineering
58	Commission Approval of Revise Stormwater Ordinance	2/5/13	2/5/13	Engineering
59	Review Tree Protection/Landscaping Ordinance	2/6/13	4/30/13	Engineering,Parks&Recreation
60	Revise Tree Protection/Landscaping Ordinance	5/1/13	5/21/13	Engineering,Parks&Recreation
61	Commission Approval of Revise Tree Protection/Landscaping Ordinance	5/22/13	5/22/13	Engineering
62	Review Subdivision Design and Construction Codes	5/23/13	7/3/13	Engineering
63	Revise Subdivision Design and Construction Codes	7/4/13	7/24/13	Engineering
64	Commission Approval of Revise Subdivision Design and Construction Codes	7/25/13	7/25/13	Engineering
65	**INFORMATION GATHERING, PLANNING, DESIGN, AND CONSTRUCTION STAGE**	**9/19/12**	**4/9/26**	
66	RFP - Stormwater Inventory	9/19/12	10/30/12	Engineering
67	Select Consultant for Stormwater Inventory	10/31/12	11/27/12	Engineering,IT
68	NTP - Stormwater Inventory Consultants	11/28/12	11/28/12	Engineering

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

69	**Phase I - Rae's Creek Watershed**	**11/29/12**	**10/2/18**	
70	Inventory and Inspect Existing Stormwater Structures	11/29/12	9/4/13	Engineering,Consultants
71	Assemble Historical Monitoring Data	9/5/13	10/16/13	Engineering,Consultants
72	Download Inventory Data into GIS and Database	9/5/13	1/22/14	Engineering,Consultants
73	Develop a Rain-Gage Grid System	10/17/13	1/8/14	Engineering
74	RFP - Watershed Assessment & Analysis	1/23/14	4/16/14	Engineering
75	Select Consultant(s) for Watershed Assessment & Analysis	4/17/14	4/30/14	Engineering
76	Commission Approval of Consultant (Watershed Assessment & Analysis)	5/1/14	5/20/14	Engineering
77	NTP - Watershed Assessment & Analysis	5/21/14	5/21/14	Engineering
78	Evaulate Receiving Waters	5/22/14	7/23/14	Engineering,Consultants
79	Floodplain Management Assessment	5/22/14	7/23/14	Engineering,Planning,Consultants
80	Review City/County Master Plan(s)	5/22/14	7/23/14	Engineering,Planning,Consultants
81	Determine Estimated Population/Growth/Change	5/22/14	7/23/14	Engineering,Planning,Consultants
82	Estimate Existing Land use	7/24/14	9/24/14	Engineering,Planning,Consultants
83	Estimate Existing Impervious Cover (Percentage)	7/24/14	10/27/14	Engineering,Consultants
84	Evaluate Existing Land Use Codes & Zoning	7/24/14	9/24/14	Engineering,Planning,Consultants
85	Revised & Establish New Land Use Codes	10/27/14	12/29/14	Engineering,Planning,Consultants
86	Link Watershed/Stormwater and Land Use Together	7/24/14	9/24/14	Engineering,Planning,Consultants
87	Redefine Watershed & Subwatershed Boundaries	12/29/14	2/9/15	Engineering,Planning,Consultants
88	Build-Out Analysis (Full Development of Zoning)	12/29/14	2/9/15	Engineering,Planning,Consultants
89	Estimate Existing and Future Impervious Cover	2/9/15	3/23/15	Engineering,Planning,Consultants
90	Analyze Existing Structures for Present & Future Use (Hydrology and Hydraulics)	3/23/15	9/7/15	Engineering,Consultants
91	Analyze Water Quality	9/7/15	1/11/16	Engineering,Consultants
92	Implement Short and Long-term BMPs in Strategic Areas	1/11/16	4/4/16	Engineering,Natural Science Academy,Consultants,Others
93	Methods to Maintaining a Connected Buffer System in the Watershed	4/4/16	6/6/16	Engineering,Natural Science Academy,Consultants,Others
94	Methods to Reduce Flood Damage from Current Levels	4/4/16	5/16/16	Engineering,Natural Science Academy,Consultants,Others
95	Methods to Reduce Pollutant from Current Levels	4/4/16	5/16/16	Engineering,Natural Science Academy,Consultants,Others
96	Methods to Enhance & Maintain the Overall Aquatic Diversity in the Watershed	4/4/16	5/16/16	Engineering,Natural Science Academy,Consultants,Others
97	Methods to Enhance & Maintain Channel Integrity in the Watershed	4/4/16	5/16/16	Engineering,Natural Science Academy,Consultants,Others
98	Methods to Limit the amount of Development in the Flood Plain	4/4/16	5/16/16	Engineering,Planning,Consultants
99	Develop Trail Systems for Walking, Biking, and Jogging	6/6/16	8/29/16	Engineering,Parks & Recreation,Planning,Consultants
100	Methods to Enhance & Maintain Current Wetlands or Constructed Wetlands	6/6/16	7/18/16	Engineering,Natural Science Academy,Consultants,Others
101	Identify Major Drainage Projects for Design & Construction (Phase I Projects)	8/29/16	9/19/16	Engineering,Consultants
102	RFPs for Major Drainage Projects (Design) - (Phase I Projects)	9/19/16	12/12/16	Engineering
103	Start Acquiring Property for Stormwater Facilities	9/19/16	9/4/17	Engineering
104	Select Design Consultants for Major Drainage Projects (Design) - (Phase I Projects)	12/12/16	1/2/17	Engineering
105	Commission Approval of Consultants (Drainage Projects)	1/2/17	1/3/17	Engineering
106	NTP - Design Major Drainage Projects (Phase - I)	1/3/17	7/18/17	Engineering
107	Bid Major Drainage Projects (Phase - I)	9/4/17	9/5/17	Engineering
108	Construct Major Drainage Projects (Phase - I)	9/5/17	10/2/18	Engineering,Consultants

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

109	**Phase II - Rocky Creek Watershed**	9/5/13	6/27/19	
110	Inventory and Inspect Existing Stormwater Structures	9/5/13	6/11/14	Engineering,Consultant
111	Assemble Historical Monitoring Data	10/17/13	11/27/13	Engineering,Consultant
112	Download Inventory Data into GIS and Database	6/12/14	10/29/14	Engineering,Consultant
113	Develop a Rain-Gage Grid System	11/28/13	2/19/14	Engineering
114	RFP - Watershed Assessment & Analysis	10/30/14	1/21/15	Engineering
115	Select Consultant(s) for Watershed Assessment & Analysis	1/22/15	2/4/15	Engineering
116	Commission Approval of Consultant (Watershed Assessment & Analysis)	2/5/15	2/24/15	Engineering
117	NTP - Watershed Assessment & Analysis	2/25/15	2/25/15	Engineering
118	Evaulate Receiving Waters	2/26/15	4/29/15	Engineering,Consultant
119	Floodplain Management Assessment	2/26/15	4/29/15	Engineering,Planning,Consultants
120	Review City/County Master Plan(s)	2/26/15	4/29/15	Engineering,Planning,Consultants
121	Determine Estimated Population/Growth/Change	2/26/15	4/29/15	Engineering,Planning,Consultants
122	Estimate Existing Land use	4/30/15	7/1/15	Engineering,Planning,Consultants
123	Estimate Existing Impervious Cover (Percentage)	4/30/15	7/1/15	Engineering,Consultant
124	Evaluate Existing Land Use Codes & Zoning	4/30/15	7/1/15	Engineering,Planning,Consultants
125	Revised & Establish New Land Use Codes	7/2/15	9/2/15	Engineering,Planning,Consultants
126	Link Watershed/Stormwater and Land Use Together	4/30/15	7/1/15	Engineering,Planning,Consultants
127	Redefine Watershed & Subwatershed Boundaries	9/3/15	10/14/15	Engineering,Planning,Consultants
128	Build-Out Analysis (Full Development of Zoning)	9/3/15	10/14/15	Engineering,Planning,Consultants
129	Estimate Existing and Future Impervious Cover	10/15/15	11/25/15	Engineering,Planning,Consultants
130	Analyze Existing Structures for Present & Future Use (Hydrology and Hydraulics)	11/26/15	5/11/16	Engineering,Consultant
131	Analyze Water Quality	5/12/16	9/14/16	Engineering,Consultant
132	Implement Short and Long-term BMPs in Strategic Areas	9/15/16	12/7/16	Engineering,Natural Science Academy,Consultants,Others
133	Methods to Maintaining a Connected Buffer System in the Watershed	12/8/16	2/8/17	Engineering,Natural Science Academy,Consultants,Others
134	Methods to Reduce Flood Damage from Current Levels	12/8/16	1/18/17	Engineering,Natural Science Academy,Consultants,Others
135	Methods to Reduce Pollutant from Current Levels	12/8/16	1/18/17	Engineering,Natural Science Academy,Consultants,Others
136	Methods to Enhance & Maintain the Overall Aquatic Diversity in the Watershed	12/8/16	1/18/17	Engineering,Natural Science Academy,Consultants,Others
137	Methods to Enhance & Maintain Channel Integrity in the Watershed	12/8/16	1/18/17	Engineering,Natural Science Academy,Consultants,Others
138	Methods to Limit the amount of Development in the Flood Plain	12/8/16	1/18/17	Engineering,Planning,Consultants
139	Develop Trail Systems for Walking, Biking, and Jogging	2/9/17	5/3/17	Engineering,Parks & Recreation,Planning,Consultant
140	Methods to Enhance & Maintain Current Wetlands or Constructed Wetlands	2/9/17	3/22/17	Engineering,Natural Science Academy,Consultants,Others
141	Identify Major Drainage Projects for Design & Construction (Phase II Projects)	5/4/17	6/14/17	Engineering,Consultant
142	RFPs for Major Drainage Projects (Design) - (Phase II Projects)	6/15/17	9/6/17	Engineering
143	Start Acquiring Property for Stormwater Facilities	6/15/17	5/30/18	Engineering
144	Select Design Consultants for Major Drainage Projects (Design) - (Phase II Projects)	9/7/17	9/27/17	Engineering
145	Commission Approval of Consultants (Drainage Projects)	9/28/17	9/28/17	Engineering
146	NTP - Design Major Drainage Projects (Phase - II)	9/29/17	4/12/18	Engineering
147	Bid Major Drainage Projects (Phase - II)	5/31/18	5/31/18	Engineering
148	Construct Major Drainage Projects (Phase - II)	6/1/18	6/27/19	Engineering,Construction Contractors

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

149	**Phase III - Butler Creek Watershed**	6/12/14	3/5/20	
150	Inventory and Inspect Existing Stormwater Structures	6/12/14	3/18/15	Engineering,Consultant
151	Assemble Historical Monitoring Data	6/12/14	7/23/14	Engineering,Consultant
152	Download Inventory Data into GIS and Database	3/19/15	8/5/15	Engineering,Consultant
153	Develop a Rain-Gage Grid System	7/24/14	10/15/14	Engineering
154	RFP - Watershed Assessment & Analysis	8/6/15	10/28/15	Engineering
155	Select Consultant(s) for Watershed Assessment & Analysis	10/29/15	11/11/15	Engineering
156	Commission Approval of Consultant (Watershed Assessment & Analysis)	11/12/15	12/1/15	Engineering
157	NTP - Watershed Assessment & Analysis	12/2/15	12/2/15	Engineering
158	Evaulate Receiving Waters	12/3/15	2/3/16	Engineering,Consultant
159	Floodplain Management Assessment	12/3/15	2/3/16	Engineering,Planning,Consultants
160	Review City/County Master Plan(s)	12/3/15	2/3/16	Engineering,Planning,Consultants
161	Determine Estimated Population/Growth/Change	12/3/15	2/3/16	Engineering,Planning,Consultants
162	Estimate Existing Land use	2/4/16	4/6/16	Engineering,Planning,Consultants
163	Estimate Existing Impervious Cover (Percentage)	2/4/16	4/6/16	Engineering,Consultant
164	Evaluate Existing Land Use Codes & Zoning	2/4/16	4/6/16	Engineering,Planning,Consultants
165	Revised & Establish New Land Use Codes	4/7/16	6/8/16	Engineering,Planning,Consultants
166	Link Watershed/Stormwater and Land Use Together	2/4/15	4/6/16	Engineering,Planning,Consultants
167	Redefine Watershed & Subwatershed Boundaries	6/9/16	7/20/16	Engineering,Planning,Consultants
168	Build-Out Analysis (Full Development of Zoning)	6/9/16	7/20/16	Engineering,Planning,Consultants
169	Estimate Existing and Future Impervious Cover	7/21/16	8/31/16	Engineering,Planning,Consultants
170	Analyze Existing Structures for Present & Future Use (Hydrology and Hydraulics)	9/1/16	2/15/17	Engineering,Consultant
171	Analyze Water Quality	2/16/17	6/21/17	Engineering,Consultant
172	Implement Short and Long-term BMPs in Strategic Areas	6/22/17	9/13/17	Engineering,Natural Science Academy,Consultants,Others
173	Methods to Maintaining a Connected Buffer System in the Watershed	9/14/17	11/15/17	Engineering,Natural Science Academy,Consultants,Others
174	Methods to Reduce Flood Damage from Current Levels	9/14/17	10/25/17	Engineering,Natural Science Academy,Consultants,Others
175	Methods to Reduce Pollutant from Current Levels	9/14/17	10/25/17	Engineering,Natural Science Academy,Consultants,Others
176	Methods to Enhance & Maintain the Overall Aquatic Diversity in the Watershed	9/14/17	10/25/17	Engineering,Natural Science Academy,Consultants,Others
177	Methods to Enhance & Maintain Channel Integrity in the Watershed	9/14/17	10/25/17	Engineering,Natural Science Academy,Consultants,Others
178	Methods to Limit the amount of Development in the Flood Plain	9/14/17	10/25/17	Engineering,Planning,Consultants
179	Develop Trail Systems for Walking, Biking, and Jogging	11/16/17	2/7/18	Engineering,Parks & Recreation,Planning,Consultant
180	Methods to Enhance & Maintain Current Wetlands or Constructed Wetlands	11/16/17	12/27/17	Engineering,Natural Science Academy,Consultants,Others
181	Identify Major Drainage Projects for Design & Construction (Phase III Projects)	2/8/18	3/21/18	Engineering,Consultant
182	RFPs for Major Drainage Projects (Design) - (Phase III Projects)	3/22/18	6/13/18	Engineering
183	Start Acquiring Property for Stormwater Facilities	3/22/18	3/6/19	Engineering
184	Select Design Consultants for Major Drainage Projects (Design) - (Phase III Projects)	6/14/18	7/4/18	Engineering
185	Commission Approval of Consultants (Drainage Projects)	7/5/18	7/5/18	Engineering
186	NTP - Design Major Drainage Projects (Phase - III)	7/6/18	1/17/19	Engineering
187	Bid Major Drainage Projects (Phase - III)	3/7/19	3/7/19	Engineering
188	Construct Major Drainage Projects (Phase - III)	3/8/19	3/5/20	Engineering,Construction Contractors

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

189	Phase IV - Rock Creek Watershed	3/19/15	1/7/21	
190	Inventory and Inspect Existing Stormwater Structures	3/19/15	12/23/15	Engineering,Consultant
191	Assemble Historical Monitoring Data	3/19/15	4/29/15	Engineering,Consultant
192	Download Inventory Data into GIS and Database	12/24/15	5/11/16	Engineering,Consultant
193	Develop a Rain-Gage Grid System	4/30/15	7/22/15	Engineering
194	RFP - Watershed Assessment & Analysis	5/12/16	8/3/16	Engineering
195	Select Consultant(s) for Watershed Assessment & Analysis	8/4/16	8/17/16	Engineering
196	Commission Approval of Consultant (Watershed Assessment & Analysis)	8/18/16	9/6/16	Engineering
197	NTP - Watershed Assessment & Analysis	9/7/16	9/7/16	Engineering
198	Evaulate Receiving Waters	9/8/16	11/9/16	Engineering,Consultant
199	Floodplain Management Assessment	9/8/16	11/9/16	Engineering,Planning,Consultants
200	Review City/County Master Plan(s)	9/8/16	11/9/16	Engineering,Planning,Consultants
201	Determine Estimated Population/Growth/Change	9/8/16	11/9/16	Engineering,Planning,Consultants
202	Estimate Existing Land use	11/10/16	1/11/17	Engineering,Planning,Consultants
203	Estimate Existing Impervious Cover (Percentage)	11/10/16	1/11/17	Engineering,Consultant
204	Evaluate Existing Land Use Codes & Zoning	11/10/16	1/11/17	Engineering,Planning,Consultants
205	Revised & Establish New Land Use Codes	1/12/17	3/15/17	Engineering,Planning,Consultants
206	Link Watershed/Stormwater and Land Use Together	11/10/16	1/11/17	Engineering,Planning,Consultants
207	Redefine Watershed & Subwatershed Boundaries	3/16/17	4/26/17	Engineering,Planning,Consultants
208	Build-Out Analysis (Full Development of Zoning)	3/16/17	4/26/17	Engineering,Planning,Consultants
209	Estimate Existing and Future Impervious Cover	4/27/17	6/7/17	Engineering,Planning,Consultants
210	Analyze Existing Structures for Present & Future Use (Hydrology and Hydraulics)	6/8/17	11/22/17	Engineering,Consultant
211	Analyze Water Quality	11/23/17	3/28/18	Engineering,Consultant
212	Implement Short and Long-term BMPs in Strategic Areas	3/29/18	6/20/18	Engineering,Natural Science Academy,Consultants,Others
213	Methods to Maintaining a Connected Buffer System in the Watershed	6/21/18	8/22/18	Engineering,Natural Science Academy,Consultants,Others
214	Methods to Reduce Flood Damage from Current Levels	6/21/18	8/1/18	Engineering,Natural Science Academy,Consultants,Others
215	Methods to Reduce Pollutant from Current Levels	6/21/18	8/1/18	Engineering,Natural Science Academy,Consultants,Others
216	Methods to Enhance & Maintain the Overall Aquatic Diversity in the Watershed	6/21/18	8/1/18	Engineering,Natural Science Academy,Consultants,Others
217	Methods to Enhance & Maintain Channel Integrity in the Watershed	6/21/18	8/1/18	Engineering,Natural Science Academy,Consultants,Others
218	Methods to Limit the amount of Development in the Flood Plain	6/21/18	8/1/18	Engineering,Planning,Consultants
219	Develop Trail Systems for Walking, Biking, and Jogging	8/23/18	11/14/18	Engineering,Parks & Recreation,Planning,Consultant
220	Methods to Enhance & Maintain Current Wetlands or Constructed Wetlands	8/23/18	10/3/18	Engineering,Natural Science Academy,Consultants,Others
221	Identify Major Drainage Projects for Design & Construction (Phase IV Projects)	11/15/18	12/26/18	Engineering,Consultant
222	RFPs for Major Drainage Projects (Design) - (Phase IV Projects)	12/27/18	3/20/19	Engineering
223	Start Acquiring Property for Stormwater Facilities	12/27/18	12/11/19	Engineering
224	Select Design Consultants for Major Drainage Projects (Design) - (Phase IV Projects)	3/21/19	4/10/19	Engineering
225	Commission Approval of Consultants (Drainage Projects)	4/11/19	4/11/19	Engineering
226	NTP - Design Major Drainage Projects (Phase - IV)	4/12/19	10/24/19	Engineering
227	Bid Major Drainage Projects (Phase - IV)	12/12/19	12/12/19	Engineering
228	Construct Major Drainage Projects (Phase - IV)	12/13/19	1/7/21	Engineering,Construction Contractors

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

229	Phase V - Oates Creek Watershed	12/24/15	10/14/21	
230	Inventory and inspect Existing Stormwater Structures	12/24/15	9/28/16	Engineering,Consultant
231	Assemble Historical Monitoring Data	12/24/15	2/3/16	Engineering,Consultant
232	Download Inventory Data into GIS and Database	9/29/16	2/15/17	Engineering,Consultant
233	Develop a Rain-Gage Grid System	2/4/16	4/27/16	Engineering
234	RFP - Watershed Assessment & Analysis	2/16/17	5/10/17	Engineering
235	Select Consultant(s) for Watershed Assessment & Analysis	5/11/17	5/24/17	Engineering
236	Commission Approval of Consultant (Watershed Assessment & Analysis)	5/25/17	6/13/17	Engineering
237	NTP - Watershed Assessment & Analysis	6/14/17	6/14/17	Engineering
238	Evaulate Receiving Waters	6/15/17	8/16/17	Engineering,Consultant
239	Floodplain Management Assessment	6/15/17	8/16/17	Engineering,Planning,Consultants
240	Review City/County Master Plan(s)	6/15/17	8/16/17	Engineering,Planning,Consultants
241	Determine Estimated Population/Growth/Change	6/15/17	8/16/17	Engineering,Planning,Consultants
242	Estimate Existing Land use	8/17/17	10/18/17	Engineering,Planning,Consultants
243	Estimate Existing Impervious Cover (Percentage)	8/17/17	10/18/17	Engineering,Consultant
244	Evaluate Existing Land Use Codes & Zoning	8/17/17	10/18/17	Engineering,Planning,Consultants
245	Revised & Establish New Land Use Codes	10/19/17	12/20/17	Engineering,Planning,Consultants
246	Link Watershed/Stormwater and Land Use Together	8/17/17	10/18/17	Engineering,Planning,Consultants
247	Redefine Watershed & Subwatershed Boundaries	12/21/17	1/31/18	Engineering,Planning,Consultants
248	Build-Out Analysis (Full Development of Zoning)	12/21/17	1/31/18	Engineering,Planning,Consultants
249	Estimate Existing and Future Impervious Cover	2/1/18	3/14/18	Engineering,Planning,Consultants
250	Analyze Existing Structures for Present & Future Use (Hydrology and Hydraulics)	3/15/18	8/29/18	Engineering,Consultant
251	Analyze Water Quality	8/30/18	1/2/19	Engineering,Consultant
252	Implement Short and Long-term BMPs in Strategic Areas	1/3/19	3/27/19	Engineering,Natural Science Academy,Consultants,Others
253	Methods to Maintaining a Connected Buffer System in the Watershed	3/28/19	5/29/19	Engineering,Natural Science Academy,Consultants,Others
254	Methods to Reduce Flood Damage from Current Levels	3/28/19	5/8/19	Engineering,Natural Science Academy,Consultants,Others
255	Methods to Reduce Pollutant from Current Levels	3/28/19	5/8/19	Engineering,Natural Science Academy,Consultants,Others
256	Methods to Enhance & Maintain the Overall Aquatic Diversity in the Watershed	3/28/19	5/8/19	Engineering,Natural Science Academy,Consultants,Others
257	Methods to Enhance & Maintain Channel Integrity in the Watershed	3/28/19	5/8/19	Engineering,Natural Science Academy,Consultants,Others
258	Methods to Limit the amount of Development in the Flood Plain	3/28/19	5/8/19	Engineering,Planning,Consultants
259	Develop Trail Systems for Walking, Biking, and Jogging	5/30/19	8/21/19	Engineering,Parks & Recreation,Planning Consultant
260	Methods to Enhance & Maintain Current Wetlands or Constructed Wetlands	5/30/19	7/10/19	Engineering,Natural Science Academy,Consultants,Others
261	Identify Major Drainage Projects for Design & Construction (Phase V Projects)	8/22/19	10/2/19	Engineering,Consultant
262	RFPs for Major Drainage Projects (Design) - (Phase V Projects)	10/3/19	12/25/19	Engineering
263	Start Acquiring Property for Stormwater Facilities	10/3/19	9/16/20	Engineering
264	Select Design Consultants for Major Drainage Projects (Design) - (Phase V Projects)	12/26/19	1/15/20	Engineering
265	Commission Approval of Consultants (Drainage Projects)	1/16/20	1/16/20	Engineering
266	NTP - Design Major Drainage Projects (Phase - V)	1/17/20	7/30/20	Engineering
267	Bid Major Drainage Projects (Phase - V)	9/17/20	9/17/20	Engineering
268	Construct Major Drainage Projects (Phase - V)	9/18/20	10/14/21	Engineering,Construction Contractors

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

269	**Phase VI - Spirit Creek Watershed**	**9/29/16**	**6/23/22**	
270	Inventory and Inspect Existing Stormwater Structures	9/29/16	7/5/17	Engineering,Consultant
271	Assemble Historical Monitoring Data	9/29/16	11/9/16	Engineering,Consultant
272	Download Inventory Data into GIS and Database	7/6/17	11/22/17	Engineering,Consultant
273	Develop a Rain-Gage Grid System	11/10/16	2/1/17	Engineering
274	RFP - Watershed Assessment & Analysis	11/23/17	2/14/18	Engineering
275	Select Consultant(s) for Watershed Assessment & Analysis	2/15/18	2/28/18	Engineering
276	Commission Approval of Consultant (Watershed Assessment & Analysis)	3/1/18	3/20/18	Engineering
277	NTP - Watershed Assessment & Analysis	3/21/18	3/21/18	Engineering
278	Evaulate Receiving Waters	3/22/18	5/23/18	Engineering,Consultant
279	Floodplain Management Assessment	3/22/18	5/23/18	Engineering,Planning,Consultants
280	Review City/County Master Plan(s)	3/22/18	5/23/18	Engineering,Planning,Consultants
281	Determine Estimated Population/Growth/Change	3/22/18	5/23/18	Engineering,Planning,Consultants
282	Estimate Existing Land use	5/24/18	7/25/18	Engineering,Planning,Consultants
283	Estimate Existing Impervious Cover (Percentage)	5/24/18	7/25/18	Engineering,Consultant
284	Evaluate Existing Land Use Codes & Zoning	5/24/18	7/25/18	Engineering,Planning,Consultants
285	Revised & Establish New Land Use Codes	7/26/18	9/26/18	Engineering,Planning,Consultants
286	Link Watershed/Stormwater and Land Use Together	5/24/18	7/25/18	Engineering,Planning,Consultants
287	Redefine Watershed & Subwatershed Boundaries	9/27/18	11/7/18	Engineering,Planning,Consultants
288	Build-Out Analysis (Full Development of Zoning)	9/27/18	11/7/18	Engineering,Planning,Consultants
289	Estimate Existing and Future Impervious Cover	11/8/18	12/19/18	Engineering,Planning,Consultants
290	Analyze Existing Structures for Present & Future Use (Hydrology and Hydraulics)	12/20/18	6/5/19	Engineering,Consultant
291	Analyze Water Quality	6/6/19	10/9/19	Engineering,Consultant
292	Implement Short and Long-term BMPs in Strategic Areas	10/10/19	1/1/20	Engineering,Natural Science Academy,Consultants,Others
293	Methods to Maintaining a Connected Buffer System in the Watershed	1/2/20	3/4/20	Engineering,Natural Science Academy,Consultants,Others
294	Methods to Reduce Flood Damage from Current Levels	1/2/20	2/12/20	Engineering,Natural Science Academy,Consultants,Others
295	Methods to Reduce Pollutant from Current Levels	1/2/20	2/12/20	Engineering,Natural Science Academy,Consultants,Others
296	Methods to Enhance & Maintain the Overall Aquatic Diversity in the Watershed	1/2/20	2/12/20	Engineering,Natural Science Academy,Consultants,Others
297	Methods to Enhance & Maintain Channel Integrity in the Watershed	1/2/20	2/12/20	Engineering,Natural Science Academy,Consultants,Others
298	Methods to Limit the amount of Development in the Flood Plain	1/2/20	2/12/20	Engineering,Planning,Consultants
299	Develop Trail Systems for Walking, Biking, and Jogging	3/5/20	5/27/20	Engineering,Parks & Recreation,Planning,Consultant
300	Methods to Enhance & Maintain Current Wetlands or Constructed Wetlands	3/5/20	4/15/20	Engineering,Natural Science Academy,Consultants,Others
301	Identify Major Drainage Projects for Design & Construction (Phase VI Projects)	5/28/20	7/8/20	Engineering,Consultant
302	RFPs for Major Drainage Projects (Design) - (Phase VI Projects)	7/9/20	9/30/20	Engineering
303	Start Acquiring Property for Stormwater Facilities	7/9/20	6/23/21	Engineering
304	Select Design Consultants for Major Drainage Projects (Design) - (Phase VI Projects)	10/1/20	10/21/20	Engineering
305	Commission Approval of Consultants (Drainage Projects)	10/22/20	10/22/20	Engineering
306	NTP - Design Major Drainage Projects (Phase - VI)	10/23/20	5/6/21	Engineering
307	Bid Major Drainage Projects (Phase - VI)	6/24/21	6/24/21	Engineering
308	Construct Major Drainage Projects (Phase - VI)	6/25/21	6/23/22	Engineering,Construction Contractors

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

309	**Phase VII - Little Spirit Creek Watershed**	7/6/17	3/30/23	
310	Inventory and Inspect Existing Stormwater Structures	7/6/17	4/11/18	Engineering,Consultant
311	Assemble Historical Monitoring Data	7/6/17	8/16/17	Engineering,Consultant
312	Download Inventory Data into GIS and Database	4/12/18	8/29/18	Engineering,Consultant
313	Develop a Rain-Gage Grid System	8/17/17	11/8/17	Engineering
314	RFP - Watershed Assessment & Analysis	8/30/18	11/21/18	Engineering
315	Select Consultant(s) for Watershed Assessment & Analysis	11/22/18	12/5/18	Engineering
316	Commission Approval of Consultant (Watershed Assessment & Analysis)	12/6/18	12/25/18	Engineering
317	NTP - Watershed Assessment & Analysis	12/26/18	12/26/18	Engineering
318	Evaulate Receiving Waters	12/27/18	2/27/19	Engineering,Consultant
319	Floodplain Management Assessment	12/27/18	2/27/19	Engineering,Planning,Consultants
320	Review City/County Master Plan(s)	12/27/18	2/27/19	Engineering,Planning,Consultants
321	Determine Estimated Population/Growth/Change	12/27/18	2/27/19	Engineering,Planning,Consultants
322	Estimate Existing Land use	2/28/19	5/1/19	Engineering,Planning,Consultants
323	Estimate Existing Impervious Cover (Percentage)	2/28/19	5/1/19	Engineering,Consultant
324	Evaluate Existing Land Use Codes & Zoning	2/28/19	5/1/19	Engineering,Planning,Consultants
325	Revised & Establish New Land Use Codes	5/2/19	7/3/19	Engineering,Planning,Consultants
326	Link Watershed/Stormwater and Land Use Together	2/28/19	5/1/19	Engineering,Planning,Consultants
327	Redefine Watershed & Subwatershed Boundaries	7/4/19	8/14/19	Engineering,Planning,Consultants
328	Build-Out Analysis (Full Development of Zoning)	7/4/19	8/14/19	Engineering,Planning,Consultants
329	Estimate Existing and Future Impervious Cover	8/15/19	9/25/19	Engineering,Planning,Consultants
330	Analyze Existing Structures for Present & Future Use (Hydrology and Hydraulics)	9/26/19	3/11/20	Engineering,Consultant
331	Analyze Water Quality	3/12/20	7/15/20	Engineering,Consultant
332	Implement Short and Long-term BMPs in Strategic Areas	7/16/20	10/7/20	Engineering,Natural Science Academy,Consultants,Others
333	Methods to Maintaining a Connected Buffer System in the Watershed	10/8/20	12/9/20	Engineering,Natural Science Academy,Consultants,Others
334	Methods to Reduce Flood Damage from Current Levels	10/8/20	11/18/20	Engineering,Natural Science Academy,Consultants,Others
335	Methods to Reduce Pollutant from Current Levels	10/8/20	11/18/20	Engineering,Natural Science Academy,Consultants,Others
336	Methods to Enhance & Maintain the Overall Aquatic Diversity in the Watershed	10/8/20	11/18/20	Engineering,Natural Science Academy,Consultants,Others
337	Methods to Enhance & Maintain Channel Integrity in the Watershed	10/8/20	11/18/20	Engineering,Natural Science Academy,Consultants,Others
338	Methods to Limit the amount of Development in the Flood Plain	10/8/20	11/18/20	Engineering,Planning,Consultants
339	Develop Trail Systems for Walking, Biking, and Jogging	12/10/20	3/3/21	Engineering,Parks & Recreation,Planning,Consultant
340	Methods to Enhance & Maintain Current Wetlands or Constructed Wetlands	12/10/20	1/20/21	Engineering,Natural Science Academy,Consultants,Others
341	Identify Major Drainage Projects for Design & Construction (Phase VII Projects)	3/4/21	4/14/21	Engineering,Consultant
342	RFPs for Major Drainage Projects (Design) - (Phase VII Projects)	4/15/21	7/7/21	Engineering
343	Start Acquiring Property for Stormwater Facilities	4/15/21	3/30/22	Engineering
344	Select Design Consultants for Major Drainage Projects (Design) - (Phase VII Projects)	7/8/21	7/28/21	Engineering
345	Commission Approval of Consultants (Drainage Projects)	7/29/21	7/29/21	Engineering
346	NTP - Design Major Drainage Projects (Phase - VII)	7/30/21	2/10/22	Engineering
347	Bid Major Drainage Projects (Phase - VII)	3/31/22	3/31/22	Engineering
348	Construct Major Drainage Projects (Phase - VII)	4/1/22	3/30/23	Engineering,Construction Contractors

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

349	**Phase VIII - McBean Creek Watershed**	4/12/18	1/4/24	
350	Inventory and Inspect Existing Stormwater Structures	4/12/18	1/16/19	Engineering,Consultant
351	Assemble Historical Monitoring Data	4/12/18	5/23/18	Engineering,Consultant
352	Download Inventory Data into GIS and Database	1/17/19	6/5/19	Engineering,Consultant
353	Develop a Rain-Gage Grid System	5/24/18	8/15/18	Engineering
354	RFP - Watershed Assessment & Analysis	6/6/19	8/28/19	Engineering
355	Select Consultant(s) for Watershed Assessment & Analysis	8/29/19	9/11/19	Engineering
356	Commission Approval of Consultant (Watershed Assessment & Analysis)	9/12/19	10/1/19	Engineering
357	NTP - Watershed Assessment & Analysis	10/2/19	10/2/19	Engineering
358	Evaulate Receiving Waters	10/3/19	12/4/19	Engineering,Consultant
359	Floodplain Management Assessment	10/3/19	12/4/19	Engineering,Planning,Consultants
360	Review City/County Master Plan(s)	10/3/19	12/4/19	Engineering,Planning,Consultants
361	Determine Estimated Population/Growth/Change	10/3/19	12/4/19	Engineering,Planning,Consultants
362	Estimate Existing Land use	12/5/19	2/5/20	Engineering,Planning,Consultants
363	Estimate Existing impervious Cover (Percentage)	12/5/19	2/5/20	Engineering,Consultant
364	Evaluate Existing Land Use Codes & Zoning	12/5/19	2/5/20	Engineering,Planning,Consultants
365	Revised & Establish New Land Use Codes	2/6/20	4/8/20	Engineering,Planning,Consultants
366	Link Watershed/Stormwater and Land Use Together	12/5/19	2/5/20	Engineering,Planning,Consultants
367	Redefine Watershed & Subwatershed Boundaries	4/9/20	5/20/20	Engineering,Planning,Consultants
368	Build-Out Analysis (Full Development of Zoning)	4/9/20	5/20/20	Engineering,Planning,Consultants
369	Estimate Existing and Future Impervious Cover	5/21/20	7/1/20	Engineering,Planning,Consultants
370	Analyze Existing Structures for Present & Future Use (Hydrology and Hydraulics)	7/2/20	12/16/20	Engineering,Consultant
371	Analyze Water Quality	12/17/20	4/21/21	Engineering,Consultant
372	Implement Short and Long-term BMPs in Strategic Areas	4/22/21	7/14/21	Engineering,Natural Science Academy,Consultants,Others
373	Methods to Maintaining a Connected Buffer System in the Watershed	7/15/21	9/15/21	Engineering,Natural Science Academy,Consultants,Others
374	Methods to Reduce Flood Damage from Current Levels	7/15/21	8/25/21	Engineering,Natural Science Academy,Consultants,Others
375	Methods to Reduce Pollutant from Current Levels	7/15/21	8/25/21	Engineering,Natural Science Academy,Consultants,Others
376	Methods to Enhance & Maintain the Overall Aquatic Diversity in the Watershed	7/15/21	8/25/21	Engineering,Natural Science Academy,Consultants,Others
377	Methods to Enhance & Maintain Channel Integrity in the Watershed	7/15/21	8/25/21	Engineering,Natural Science Academy,Consultants,Others
378	Methods to Limit the amount of Development in the Flood Plain	7/15/21	8/25/21	Engineering,Planning,Consultants
379	Develop Trail Systems for Walking, Biking, and Jogging	9/16/21	12/8/21	Engineering,Parks & Recreation,Planning,Consultant
380	Methods to Enhance & Maintain Current Wetlands or Constructed Wetlands	9/16/21	10/27/21	Engineering,Natural Science Academy,Consultants,Others
381	Identify Major Drainage Projects for Design & Construction (Phase VIII Projects)	12/9/21	1/19/22	Engineering,Consultant
382	RFPs for Major Drainage Projects (Design) - (Phase VIII Projects)	1/20/22	4/13/22	Engineering
383	Start Acquiring Property for Stormwater Facilities	1/20/22	1/4/23	Engineering
384	Select Design Consultants for Major Drainage Projects (Design) - (Phase VIII Projects)	4/14/22	5/4/22	Engineering
385	Commission Approval of Consultants (Drainage Projects)	5/5/22	5/5/22	Engineering
386	NTP - Design Major Drainage Projects (Phase - VIII)	5/6/22	11/17/22	Engineering
387	Bid Major Drainage Projects (Phase - VIII)	1/5/23	1/5/23	Engineering
388	Construct Major Drainage Projects (Phase - VIII)	1/6/23	1/4/24	Engineering,Construction Contractors

PROPOSED STORMWATER IMPLEMENTATION SCHEDULE

389	**Phase IX - Phinizy Swamp Watershed**	**1/17/19**	**4/9/26**	
390	Inventory and Inspect Existing Stormwater Structures	1/17/19	10/23/19	Engineering,Consultant
391	Assemble Historical Monitoring Data	1/17/19	2/27/19	Engineering,Consultant
392	Download Inventory Data into GIS and Database	10/24/19	3/11/20	Engineering,Consultant
393	Develop a Rain-Gage Grid System	2/28/19	5/22/19	Engineering
394	RFP - Watershed Assessment & Analysis	3/12/20	6/3/20	Engineering
395	Select Consultant(s) for Watershed Assessment & Analysis	6/4/20	6/17/20	Engineering
396	Commission Approval of Consultant (Watershed Assessment & Analysis)	6/18/20	7/7/20	Engineering
397	NTP - Watershed Assessment & Analysis	7/8/20	7/8/20	Engineering
398	Evaulate Receiving Waters	7/9/20	9/9/20	Engineering,Consultant
399	Floodplain Management Assessment	7/9/20	9/9/20	Engineering,Planning,Consultants
400	Review City/County Master Plan(s)	7/9/20	9/9/20	Engineering,Planning,Consultants
401	Determine Estimated Population/Growth/Change	7/9/20	9/9/20	Engineering,Planning,Consultants
402	Estimate Existing Land use	9/10/20	11/11/20	Engineering,Planning,Consultants
403	Estimate Existing Impervious Cover (Percentage)	9/10/20	11/11/20	Engineering,Consultant
404	Evaluate Existing Land Use Codes & Zoning	9/10/20	11/11/20	Engineering,Planning,Consultants
405	Revised & Establish New Land Use Codes	11/12/20	1/13/21	Engineering,Planning,Consultants
406	Link Watershed/Stormwater and Land Use Together	9/10/20	11/11/20	Engineering,Planning,Consultants
407	Redefine Watershed & Subwatershed Boundaries	1/14/21	2/24/21	Engineering,Planning,Consultants
408	Build-Out Analysis (Full Development of Zoning)	1/14/21	2/24/21	Engineering,Planning,Consultants
409	Estimate Existing and Future Impervious Cover	2/25/21	4/7/21	Engineering,Planning,Consultants
410	Analyze Existing Structures for Present & Future Use (Hydrology and Hydraulics)	4/8/21	9/22/21	Engineering,Consultant
411	Analyze Water Quality	9/23/21	1/26/22	Engineering,Consultant
412	Implement Short and Long-term BMPs in Strategic Areas	1/27/22	4/20/22	Engineering,Natural Science Academy,Consultants,Others
413	Methods to Maintaining a Connected Buffer System in the Watershed	4/21/22	6/22/22	Engineering,Natural Science Academy,Consultants,Others
414	Methods to Reduce Flood Damage from Current Levels	4/21/22	6/1/22	Engineering,Natural Science Academy,Consultants,Others
415	Methods to Reduce Pollutant from Current Levels	4/21/22	6/1/22	Engineering,Natural Science Academy,Consultants,Others
416	Methods to Enhance & Maintain the Overall Aquatic Diversity in the Watershed	4/21/22	6/1/22	Engineering,Natural Science Academy,Consultants,Others
417	Methods to Enhance & Maintain Channel Integrity in the Watershed	4/21/22	6/1/22	Engineering,Natural Science Academy,Consultants,Others
418	Methods to Limit the amount of Development in the Flood Plain	4/21/22	6/1/22	Engineering,Planning,Consultants
419	Develop Trail Systems for Walking, Biking, and Jogging	6/23/22	9/14/22	Engineering,Parks & Recreation,Planning,Consultant
420	Methods to Enhance & Maintain Current Wetlands or Constructed Wetlands	6/23/22	8/3/22	Engineering,Natural Science Academy,Consultants,Others
421	Identify Major Drainage Projects for Design & Construction (Phase IX Projects)	9/15/22	10/26/22	Engineering,Consultant
422	RFPs for Major Drainage Projects (Design) - (Phase IX Projects)	10/27/22	1/18/23	Engineering
423	Start Acquiring Property for Stormwater Facilities	10/27/22	10/11/23	Engineering
424	Select Design Consultants for Major Drainage Projects (Design) - (Phase IX Projects)	1/19/23	2/8/23	Engineering
425	Commission Approval of Consultants (Drainage Projects)	2/9/23	2/9/23	Engineering
426	NTP - Design Major Drainage Projects (Phase - IX)	2/10/23	8/24/23	Engineering
427	Bid Major Drainage Projects (Phase - IX)	10/12/23	10/12/23	Engineering
428	Construct Major Drainage Projects (Phase - IX)	10/13/23	4/9/26	Engineering,Construction Contractors
429	**IMPLEMENTATION AND PROJECTS COMPLETED**	**4/10/26**	**4/10/26**	
430	Implementation and Projects Completed	4/10/26	4/10/26	Engineering

3

CITY OF AUGUSTA ESTIMATED STORMWATER CASH FLOW SUMMARY

Engineering	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	TOTAL
Stormwater Inventory	$0	$200,000	$1,000,000	$1,000,000	$500,000	$300,000	$250,000	$3,250,000
Watershed(s) Based Planning and Engineering	$0	$200,000	$500,000	$500,000	$500,000	$500,000	$500,000	$2,700,000
Education, Research, and Development	$0	$15,000	$30,000	$30,000	$30,000	$30,000	$30,000	$165,000
General Engineering	$0	$40,000	$150,000	$150,000	$150,000	$150,000	$150,000	$790,000
Subtotal:	$0	$455,000	$1,680,000	$1,680,000	$1,180,000	$980,000	$930,000	$6,905,000

Enforcements	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	TOTAL
Implementation of Ordinances and Design Manuals	$0	$15,000	$100,000	$25,000	$5,000	$5,000	$5,000	$155,000
Subtotal:	$0	$15,000	$100,000	$25,000	$5,000	$5,000	$5,000	$155,000

Operation and Preventative Maintenance	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	TOTAL
Catchbasin/Juction/Outfall Maintenance	$150,000	$150,000	$500,000	$500,000	$500,000	$500,000	$500,000	$2,800,000
Pond/Lake Maintenance	$0	$0	$250,000	$500,000	$500,000	$500,000	$500,000	$2,250,000
ROW Maintenance/Mowing	$0	$0	$1,000,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$5,800,000
Storm Sewer Maintenance	$0	$0	$100,000	$500,000	$250,000	$250,000	$250,000	$1,350,000
Ditch Maintenance	$0	$0	$200,000	$750,000	$750,000	$750,000	$750,000	$3,200,000
Easement Maintenance	$0	$0	$100,000	$400,000	$300,000	$200,000	$200,000	$1,200,000
Emergency Repairs	$0	$500,000	$250,000	$250,000	$250,000	$250,000	$250,000	$1,750,000
Bridge/Culvert Maintenance	$40,000	$0	$500,000	$750,000	$750,000	$750,000	$750,000	$3,540,000
Channel Creek Maintenance	$0	$0	$200,000	$500,000	$400,000	$400,000	$400,000	$1,900,000
Special Stormwater Structures (Levee, Dam, etc.)	$0	$0	$75,000	$175,000	$100,000	$100,000	$100,000	$550,000
Street Sweeping	$0	$0	$250,000	$250,000	$250,000	$250,000	$250,000	$1,250,000
Subtotal:	$190,000	$650,000	$3,425,000	$5,775,000	$5,250,000	$5,150,000	$5,150,000	$25,590,000

CITY OF AUGUSTA ESTIMATED STORMWATER CASH FLOW SUMMARY

Drainage Related Improvement Projects	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	TOTAL
Design	$0	$200,000	$1,000,000	$500,000	$500,000	$3,000,000	$3,000,000	$8,200,000
Land Acquisition	$0	$0	$500,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$12,500,000
Construction	$0	$0	$3,000,000	$4,015,000	$5,165,000	$16,050,000	$16,500,000	$44,730,000
Subtotal:	$0	$200,000	$4,500,000	$5,515,000	$6,665,000	$24,050,000	$24,500,000	$65,430,000

Equipment	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	TOTAL
Equipment Purchase	$0	$0	$300,000	$1,500,000	$300,000	$300,000	$0	$2,400,000
Equipment Maintenance	$0	$0	$500,000	$100,000	$100,000	$100,000	$100,000	$900,000
Subtotal:	$0	$0	$800,000	$1,600,000	$400,000	$400,000	$100,000	$3,300,000

Material	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	TOTAL
Material Purchase	$0	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$600,000
Subtotal:	$0	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$600,000

	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	TOTAL
ESTIMATED TOTAL ANNUAL EXPENSE	$2,190,000	$4,125,000	$13,880,000	$17,340,000	$16,267,250	$33,380,013	$33,512,563	$120,694,826
ESTIMATED YEAR END BALANCE	$4,719,998	$18,242,616	$10,128,850	$11,237,232	$7,445,681	-$15,987,432	-$39,552,095	-$39,552,095

SPLOST VI. Continued passing of future SPLOST is essential to the drainage infrastructure of Augusta.

Represents the end of SPLOST VI funds. If SPLOST VII fails, these values reduce to $0.

An estimated $10,239,091 of the General Budget through salaries can be saved over a 5 year period.

Environmental Services Street Sweeping.

4

EXISTING AND POTENTIAL CAPITAL IMPROVEMENT PROJECTS

NO.	DRAINAGE RELATED PROJECTS	FUNDING STATUS	ESTIMATED FUNDING TIMEFRAME	PROJECT COST
1	Hyers Pond Dredging and Maintenance (Lake Aumond Dredging Project)	Funded	2012	$100,000
2	Upper Lake Aumond Dredging and Maintenance (Lake Olmstead Dredging Project)	Funded	2012	$400,000
3	Lower Lake Aumond Dredging and Maintenance (Lake Olmstead Dredging Project)	Funded	2012	$1,500,000
4	Upper Lake Olmstead Dredging and Maintenance (Lake Olmstead Dredging Project)	Funded	2012	$2,000,000
5	Warren Lake Dredging and Maintenance	Funded	2007	$2,000,000
6	Old McDuffie Road Street and Drainage Improvements	Funded	2012 - 2014	$840,000
7	Westside Drive Drainage Improvements	Funded	2012 - 2014	$600,000
8	East Augusta Roadway and Drainage Improvements – Phase II (Aiken Street Channel Improvements)	Partially Funded	2012 - 2013	$4,000,000
9	7th St over Augusta Canal	Partially Funded	2012 - 2013	$1,100,000
10	Dover-Lyman Street and Drainage Improvements	Partialy Funded	2012 - 2015	$4,000,000
11	Hyde Park / Wilkerson Gardens Drainage Improvements	Partially Funded	2012 - 2019	$13,235,100
12	Levee Maintenance	Partially Funded	2012 - 2015	$800,000
13	Old Waynesboro Road over Spirit Creek	Partially Funded	2012 - 2014	$1,500,000
14	Scotts Way over Raes Creek	Partially Funded	2012 - 2014	$1,500,000
15	Berckmans Road over Raes Creek	Partially Funded	2012 - 2015	$1,800,000
16	Berckmans Road Realignment and Drainage Improvements	Partially Funded	2012 - 2015	$2,700,000
17	Marks Church Road over Raes Creek	Partially Funded	2012 - 2014	$1,000,000
18	Rocky Creek Flood Hazard Mitigation Project	Partially Funded	2012 - 2015	$8,121,900
19	East Augusta Roadway and Drainage Improvements – Phase III (Azalea, Brunswick, and Albany Street Areas)	Not Funded	2013 - 2014	$1,350,000
20	East Augusta Roadway and Drainage Improvements – Phase IV (Hornsby Area)	Not Funded	2014 - 2015	$1,330,000
21	East Augusta Roadway and Drainage Improvements – Phase V (East Telfair and Japonica Drive Areas)	Not Funded	2016	$800,000
22	East Augusta Roadway and Drainage Improvements – Phase VI (East View Subdivision)	Not Funded	2016	$200,000

EXISTING AND POTENTIAL CAPITAL IMPROVEMENT PROJECTS

NO.	DRAINAGE RELATED PROJECTS	FUNDING STATUS	ESTIMATED FUNDING TIMEFRAME	PROJECT COST
23	East Augusta Roadway and Drainage Improvements – Phase VII (Riverside Park Area)	Not Funded	2016	$1,300,000
24	East Augusta Roadway and Drainage Improvements – Phase VIII (Marion homes Area)	Not Funded	2017	$2,700,000
25	Lower Lake Olmstead Dredging and Maintenance (Lake Olmstead Dredging Project)	Not Funded	2015	$1,100,000
26	Beaver Dam Ditch Dredging and Maintenance	Not Funded	2013	$100,000
27	Augusta Canal Dredging and Maintenance	Not Funded	2016 - 2017	$2,000,000
28	Augusta Canal Flood Reduction Project	Not Funded	2013 - 2018	$3,100,000
29	Rae's Creek Channel Maintenance/Restoration	Not Funded	2016 - 2018	$4,000,000
30	Rocky Creek Channel Maintenance/Restoration	Not Funded	2016 - 2017	$2,000,000
31	Rock Creek Channel Maintenance/Restoration	Not Funded	2016 - 2017	$2,000,000
32	Oates Creek Channel Maintenance/Restoration/Channel Lining	Not Funded	2016 - 2017	$2,000,000
33	Butler Creek Channel Maintenance/Restoration	Not Funded	2016 - 2017	$2,000,000
34	Spirit Creek Channel Maintenance/Restoration	Not Funded	2016 - 2017	$2,000,000
35	Little Spirit Creek Channel Maintenance/Restoration	Not Funded	2016 - 2017	$1,500,000
36	McBean Creek Channel Maintenance/Restoration	Not Funded	2016 - 2017	$1,500,000
37	Cranes Creek Channel Maintenance/Restoration	Not Funded	2016 - 2017	$1,000,000
38	Phinizy Swamp Maintenance	Not Funded	2016 - 2017	$1,000,000
39	Downtown Conceptual Infrastructure Plan	Not Funded	2016 - 2017	$1,000,000
40	Greene Street and Drainage Improvements, Including Street Light and Signal Upgrades (13th Street to East Boundary Street)	Not Funded	2021 - 2022	$10,000,000
41	Ellis Street and Drainage (13th Street to Sand Bar Ferry Rd.)	Not Funded	2018 - 2021	$10,300,000
42	Broad Street and Drainage Improvements (Washington Road to Sand Bar Ferry)	Not Funded	2017 - 2022	$16,000,000
43	Telfair Street and Drainage Improvements (15th Street to East Boundary Street)	Not Funded	2018 - 2022	$15,000,000
44	13th Street and Drainage Improvements (RA Dent to Reynolds Street)	Not Funded	2017 - 2020	$7,600,000
45	12th Street and Drainage Improvements (Telfair Street to Reynolds Street)	Not Funded	2017 - 2019	$4,000,000

EXISTING AND POTENTIAL CAPITAL IMPROVEMENT PROJECTS

NO.	DRAINAGE RELATED PROJECTS	FUNDING STATUS	ESTIMATED FUNDING TIMEFRAME	PROJECT COST
46	Milledgeville Road Widening and Drainage Improvements (North Leg to Barton Chapel Road)	Not Funded	2015 - 2018	$6,000,000
47	11th Street and Drainage Improvements (Wrightsboro Road to Reynolds Street)	Not Funded	2017 - 2020	$7,200,000
48	10th Street and Drainage Improvements (Wrightsboro Road to Reynolds Street)	Not Funded	2019 - 2021	$7,200,000
49	James Brown Street and Drainage Improvements (Wrightsboro Rd. to Reynolds Street)	Not Funded	2019 - 2022	$6,200,000
50	8th Street and Drainage Improvements (Walton Way to Reynolds Street)	Not Funded	2020 - 2021	$4,100,000
51	7th Street and Drainage Improvements (Twiggs Street to Reynolds Street)	Not Funded	2019 - 2022	$9,900,000
52	6th Street and Drainage Improvements (Laney Walker Blvd. to Reynolds Street)	Not Funded	2021 - 2023	$6,900,000
53	5th Street and Drainage Improvements (Laney Walker Blvd. To Reynolds Street)	Not Funded	2021 - 2024	$11,600,000
54	4th Street and Drainage Improvements (Laney Walker Blvd. to Reynolds Street)	Not Funded	2021 - 2024	$11,600,000
55	3rd Street and Drainage Improvemenst (Laney Walker Blvd. to Reynolds Street)	Not Funded	2022 - 2024	$8,500,000
56	2nd Street and Drainage Improvements (Laney Walker Blvd. to Reynolds Street)	Not Funded	2023 - 2024	$8,900,000
57	Planning, Design, and Construction of Regional Detention Ponds (County Wide)	Not Funded	2015 - 2025	$20,000,000
58	Elimination of Unwarranted Detention Ponds (County Wide)	Not Funded	2017 - 2025	$9,000,000
59	Constructed Wetlands (Countywide)	Not Funded	2025	$3,500,000
60	Recreation Projects (Watershed Based)	Not Funded	2016 - 2025	$20,000,000

TOTAL: $284,677,000

☐ Projects that have been identified through SPLOST.

NOTE:

New storm related projects will be developed as watersheds and subbasins are analyzed and modeled.

5

PERTINENT INFORMATION REQUIRED IN THE CITY OF AUGUSTA, GA STORMWATER DATABASE/GIS

BRIDGE STRUCTURE
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Bridge Type:
Material Type:
Stream Crossing:
Condition Rating:
Condition Description:
Digital Photograph:
X-Coordinate:
Y-Coordinate:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
Estimated Date of Construction:
Estimated Date for Replacement:

CULVERT STRUCTURE
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Culvert Type:
Material Type:
Stream Crossing:
Condition Rating:
Condition Description:
Digital Photograph:
Culvert Shape:
Culvert Size:
X-Coordinate:
Y-Coordinate:
Upstream Elevation:
Downstream Elevation:
Culvert Length:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
Estimated Date of Construction:
Estimated Date for Replacement:

CATCHBASIN/INLET STRUCTURE
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Catchbasin/Inlet Type:
Material Type:
Condition Rating:
Condition Description:
Digital Photograph:
Inlet Shape:
Inlet Size:
X-Coordinate:
Y-Coordinate:
Invert Elevation(s) (in, out):
Ground Elevation:
Top Cover Elevation:
Land Use (Residential, etc.):
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
Estimated Date of Construction:
Estimated Date for Replacement:

OUTFALL STRUCTURE
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Outfall Type:
Material Type:
Condition Rating:
Condition Description:
Digital Photograph:
Outlet Shape:
Outlet Size
X-Coordinate:
Y-Coordinate:
Invert Elevation(s) (in, out):
Ground Elevation:
Receiving Stormwater Description:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
Estimated Date of Construction:
Estimated Date for Replacement:

JUNCTION STRUCTURE
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Junction Type:
Material Type:
Condition Rating:
Condition Description:
Digital Photograph:
Junction Shape:
Junction Size:
X-Coordinate:
Y-Coordinate:
Invert Elevation(s) (in, out):
Ground Elevation:
Top Cover Elevation:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
Estimated Date of Construction:
Estimated Date for Replacement:

PIPE STRUCTURE
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Material Type:
Condition Rating:
Condition Description:
Digital Photograph:
Pipe Shape:
Pipe Size:
Pipe Slope %:
Flow Direction:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
* Shape Deformation
* Settlement
Estimated Date of Construction:
Estimated Date for Replacement:

PERTINENT INFORMATION REQUIRED IN THE CITY OF AUGUSTA, GA STORMWATER DATABASE/GIS

DETENTION FACILITY
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Detention Type:
Condition Rating:
Condition Description:
Digital Photograph:
Pond Shape:
Pond Size:
Receiving Stormwater Description:
Outfall Description:
Regional Drainage Area/Boundary:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
Estimated Date of Construction:

RETENTION POND
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Condition Rating:
Condition Description:
Digital Photograph:
Pond Shape:
Pond Size:
Receiving Stormwater Description:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
Estimated Date of Construction:

STREAM CHANNEL
ID No.:
Station:
Channel Description:
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Type of Stream Channel:
Watershed/Basin:
Condition Rating:
Condition Description:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:

DITCH CHANNEL
ID No.:
Station:
Channel Description:
Commission District:
Type of Ditch Channel:
Watershed/Basin:
Subbasin/Subcatchment:
Condition Rating:
Condition Description:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:

SPECIAL STORMWATER STRUCTURES
ID No:
Stormwater Structure Description:
* Levee
* Dam
* Other
Watershed/Basin:
Subbasin/Subcatchment:
Condition Rating:
Condition Description:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:

EXISTING COMBINED SEWERS
ID No.:
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Material Type:
Condition Description:
Pipe Shape:
Pipe Size:
Pipe Slope %:
Flow Direction:
Last Inspection Date:
Estimated Date of Separation:

PERTINENT INFORMATION REQUIRED IN THE CITY OF AUGUSTA, GA STORMWATER DATABASE/GIS

REGIONAL DETENTION FACILITY
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Detention Type:
Condition Rating:
Condition Description:
Digital Photograph:
Pond Shape:
Pond Size:
Receiving Stormwater Description:
Outfall Description:
Regional Drainage Area/Boundary:
No. Detention Facility within Regional Detention Facility:
Percentage Land Use:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
Estimated Date of Construction:

BANK/STREAM PROTECTION
ID No.
Commission District:
Watershed/Basin:
Subbasin/Subcatchment:
Condition Rating:
Condition Description:
Protection Type:
Digital Photograph:
X-Coordinate:
Y-Coordinate:
Last Inspection Date:
Last Maintenance Date:
Maintenance Description:
Estimated Date of Construction:

Proposed information obtained through stormwater inventory (GPS).